IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ALNYLAM PHARMACEUTICALS, INC., Plaintiff, v. PFIZER INC. and PHARMACIA & UPJOHN CO. LLC, Defendants.	)	C.A. No. 22-336-CFC **JURY TRIAL DEMANDED**
PFIZER INC., PHARMACIA & UPJOHN CO. LLC, BIONTECH SE, and BIONTECH MANUFACTURING GMBH, Counterclaim-Plaintiffs, v. ALNYLAM PHARMACEUTICALS, INC., Counterclaim-Defendant.	)	

ANSWER AND COUNTERCLAIMS IN RESPONSE TO COMPLAINT FOR PATENT INFRINGEMENT

Defendants Pfizer Inc. ("Pfizer") and Pharmacia & Upjohn Co. LLC ("Pharmacia") (collectively, "Pfizer" or "Defendants") hereby answer the Complaint for Patent Infringement ("Complaint") filed by Plaintiff Alnylam Pharmaceuticals, Inc. ("Plaintiff" or "Alnylam").

NATURE OF THE ACTION[1]

1. Alnylam is a pioneering RNA therapeutics company based in Cambridge, Massachusetts. Over a decade ago, Alnylam invented a breakthrough class of cationic biodegradable lipids used to form lipid nanoparticles ("LNP") that carry and safely deliver in the body RNA-based therapeutics or vaccines (the "Alnylam LNP Technology"). The Alnylam LNP Technology is foundational to the success of the recently-developed messenger RNA ("mRNA") based COVID vaccines. The United States Patent Office recognized Alnylam's inventive work,

[1] Pfizer understands that the headings throughout the Complaint are not allegations that require response, but to the extent that they are, Pfizer denies each.

issuing United States Patent No. 11,246,933 (the "'933 Patent") that protects the Alnylam LNP Technology. (Exhibit 1.)

RESPONSE: Pfizer admits that the Patent and Trademark Office issued the '933 Patent, but denies that the patent involves patentable work. Pfizer denies that any technology claimed by the '933 Patent contributed in any way to the success of the recently-developed mRNA based COVID-19 vaccine developed by Pfizer and BioNTech. Pfizer otherwise lacks the knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 1 and therefore denies the allegations.

2. Defendants' mRNA COVID-19 uses a cationic biodegradable lipid covered by '933 Patent. Specifically, Defendants infringe Alnylam's '933 Patent through the use of ALC-0315, a cationic biodegradable lipid formulated into LNPs that protect and deliver the vaccine's mRNA. Alnylam brings this action to recover monetary compensation for Defendants' unlicensed use of Alnylam's '933 Patent. Alnylam does not seek injunctive relief under 35 U.S.C. § 283 against such use.

RESPONSE: Paragraph 2 states legal conclusions to which no response is required. To the extent a response is required, Pfizer denies that the mRNA-based COVID-19 vaccine developed by Pfizer and BioNTech, including any of its components, infringe the '933 Patent or that Alnylam is entitled to damages. Pfizer admits that the Complaint purports to state that Alnylam does not seek injunctive relief under 35 U.S.C. § 283, but seeks to recover monetary compensation. Pfizer also admits that the mRNA based COVID-19 vaccine developed by Pfizer and BioNTech contains ALC-0315, which was not invented by Alnylam. Pfizer denies all of the remaining allegations of Paragraph 2.

THE PARTIES

3. Plaintiff Alnylam is a corporation organized under the laws of the State of Delaware with a principal place of business at 675 West Kendall Street, Henri A. Termeer Square, Cambridge, Massachusetts 02142. Founded in 2002, Alnylam is a groundbreaking life science company that has worked to harness the potential of RNA interference ("RNAi") therapeutics to transform the lives of people living with diseases that have limited or inadequate treatment options. Utilizing an earlier version of in-licensed LNP Technology, in 2018 Alnylam delivered the world's first approved RNAi therapeutic, ONPATTRO® (patisiran). ONPATTRO® is currently approved

for the treatment of polyneuropathy caused by an illness called hereditary ATTR (hATTR) amyloidosis. Alnylam has developed an additional delivery modality distinct from LNP Technology, termed GalNAc Delivery, which is utilized in three marketed products, GIVLAARI® (givosiran), approved in 2019, and OXLUMO® (lumasiran), approved in 2020, both marketed by Alnylam and LEQVIO® (inclisiran), approved in 2021, developed initially by Alnylam and licensed to Novartis.

RESPONSE: Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 3 and therefore denies the allegations.

4. Alnylam has a long history of licensing or offering to license to third parties its intellectual property, including the Alnylam LNP Technology and the GalNAc Technology.

RESPONSE: Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 4 and therefore denies the allegations.

5. Upon information and belief, Defendant Pfizer Inc. is a company organized and existing under the laws of the State of Delaware with its principal place of business at 235 East 42nd Street, New York, New York 10017. The Biologic License Approval ("BLA") Approval for COMIRNATY® is addressed to Pfizer Inc., 235 East 42nd Street, New York, NY 10017. (Exhibit 3 at 1.) Upon information and belief, all regulatory correspondence regarding Defendants' COVID-19 Vaccine is sent to Pfizer Inc.'s principal place of business. (Exhibit 3 at 1.) The prescribing information for COMIRNATY® states it is "[m]anufactured by Pfizer Inc." (Exhibit 4 at 20.) Upon information and belief, Defendant Pfizer Inc. maintains one or more facilities, including in Kalamazoo, Michigan, under the name PfizerCentre One, as a subsidiary of Pfizer Inc. and/or Defendant Pfizer Inc. is doing business as PfizerCentre One at one or more facilities, including in Kalamazoo, Michigan. Upon information and belief, Pfizer Laboratories, a division of Defendant Pfizer Inc., prepared the package insert for COMIRNATY® that was accepted by the FDA. (Exhibit 7 at 19.) Upon information and belief, Defendant Pfizer Inc. recognizes the revenue from sales of Defendants' COVID-19 Vaccine. (Exhibit 6 at 1, 4, 5, 14, 27, 29, 33-36.)

RESPONSE: Pfizer admits that Pfizer is a Delaware corporation with a principal place of business at 235 East 42nd Street, New York, New York 10017. Pfizer admits that Exhibit 3 purports to be the BLA Approval for COMIRNATY® (COVID-19 Vaccine, mRNA) and appears to be addressed to Pfizer Inc., 235 East 42nd Street, New York, NY 10017. (Exhibit 3 at 1.) The purported BLA Approval for COMIRNATY® is also addressed to BioNTech Manufacturing GmbH. Pfizer admits that Exhibit 4 purports to be the prescribing information for COMIRNATY®, which appears to state, "[m]anufactured by Pfizer Inc." (Exhibit 4 at 20.) Pfizer

admits that Pfizer maintains a facility in Kalamazoo, Michigan, under the name PfizerCentre One. Pfizer further admits that Exhibit 7 purports to be the package insert for COMIRNATY®, which appears to state, "Pfizer Laboratories Div Pfizer Inc." (Exhibit 7 at 19.) Pfizer denies the remaining allegations of Paragraph 5.

6. Upon information and belief, Defendant Pharmacia & Upjohn Co. LLC is a company organized and existing under the laws of the State of Delaware with its principal place of business at 100 Route 206 N, Peapack, New Jersey, 07977. Upon information and belief, Defendant Pharmacia & Upjohn Co. LLC is a wholly-owned subsidiary of Defendant Pfizer Inc. The BLA Approval Letter for COMIRNATY® states that, "[t]he final formulated product will be manufactured, filled, labeled and packaged . . . at Pharmacia & Upjohn Company LLC, 7000 Portage Road, Kalamazoo, Michigan." (Exhibit 3 at 1.)

RESPONSE: Pfizer admits that Pharmacia is a Delaware corporation, with a principal place of business at 7000 Portage Road Kalamazoo, MI 49001. Pfizer admits that Pharmacia is a subsidiary of Defendant Pfizer Inc. Pfizer admits that the purported BLA Approval Letter for COMIRNATY® appears to state, "[t]he final formulated product will be manufactured, filled, labeled and packaged at Pfizer Manufacturing Belgium NV, Rijksweg 12, Puurs, Belgium and at Pharmacia & Upjohn Company LLC, 7000 Portage Road, Kalamazoo, Michigan." (Exhibit 3 at 1.) Pfizer denies the remaining allegations of Paragraph 6.

7. On information and belief, Defendants Pfizer Inc. and Pharmacia & Upjohn Co. LLC are agents of each other and/or work in concert with each other with respect to the development, regulatory approval, marketing, making, sales, offers for sale, import and export, and distribution of Defendants' COVID-19 Vaccine containing ALC-0315.

RESPONSE: Paragraph 7 states legal conclusions to which no response is required. To the extent a response is required, Pfizer admits that Pfizer sought regulatory approval for COMIRNATY® (which does not contain any technology claimed by the '933 Patent) contains ALC-0315 (which was not invented by Alnylam) and that Pharmacia manufactures COMIRNATY® on behalf of Pfizer. Pfizer denies the remaining allegations of Paragraph 7.

JURISDICTION AND VENUE

8. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1, *et seq*.

RESPONSE: Paragraph 8 states legal conclusions to which no response is required. To the extent a response is required, Pfizer admits that the Complaint purports to state a claim for infringement arising under the patent laws of the United States 35 U.S.C. § 1, *et seq*. Pfizer denies the remaining allegations of Paragraph 8.

9. This Court has jurisdiction under 28 U.S.C. §§ 1331 and 1338(a) because this is a civil action arising under the Patent Act.

RESPONSE: Paragraph 9 states legal conclusions to which no response is required. To the extent a response is required and for purposes of this action only, Pfizer does not contest that this Court has subject matter jurisdiction over this action.

10. This Court has personal jurisdiction over Defendant Pfizer Inc. because it is a Delaware corporation.

RESPONSE: Paragraph 10 states legal conclusions to which no response is required. To the extent a response is required, Pfizer responds that, solely for purposes of this action and solely for the claims asserted in the Complaint, it does not contest personal jurisdiction.

11. This Court also has jurisdiction over Defendant Pfizer Inc. because, upon information and belief, it directly or indirectly makes, uses, offers for sale, and/or sells Defendants' COVID-19 Vaccine, containing ALC-0315, throughout the United States, including in this judicial district.

RESPONSE: Paragraph 11 states legal conclusions to which no response is required. To the extent a response is required, Pfizer responds that, solely for purposes of this action and solely for the claims asserted in the Complaint, it does not contest personal jurisdiction.

12. This Court has personal jurisdiction over Defendant Pharmacia & Upjohn Co. LLC because it is a Delaware corporation.

RESPONSE: Paragraph 12 states legal conclusions to which no response is required. To the extent a response is required, Pharmacia responds that, solely for purposes of this action and solely for the claims asserted in the Complaint, it does not contest personal jurisdiction.

13. This Court also has jurisdiction over Defendant Pharmacia & Upjohn Co. LLC because, upon information and belief, it directly or indirectly makes, uses, offers for sale, and/or sells Defendants' COVID-19 Vaccine, containing ALC-0315, throughout the United States, including in this judicial district.

RESPONSE: Paragraph 13 states legal conclusions to which no response is required. To the extent a response is required, Pharmacia responds that, solely for purposes of this action and solely for the claims asserted in the Complaint, it does not contest personal jurisdiction.

14. Venue is proper in this Court under 28 U.S.C. § 1400(b) because Defendant Pfizer Inc. is a Delaware corporation.

RESPONSE: Paragraph 14 states legal conclusions to which no response is required. To the extent a response is required, Pfizer responds that, solely for purposes of this action and solely for the claims asserted in the Complaint, it does not contest venue. Pfizer admits that it is a Delaware corporation.

15. Venue is proper in this Court under 28 U.S.C. § 1400(b) because Defendant Pharmacia & Upjohn Co. LLC is a Delaware corporation.

RESPONSE: Paragraph 15 states legal conclusions to which no response is required. To the extent a response is required, Pharmacia responds that, solely for purposes of this action and solely for the claims asserted in the Complaint, it does not contest venue. Pharmacia admits that it is a Delaware corporation.

BACKGROUND

A. RNA THERAPEUTICS

16. The promise of RNA-based therapeutics (including RNAi and mRNA) has long been known, but scientists have struggled for decades to translate the promise into successful human therapeutics. The main challenge scientists around the world struggled with was how to

deliver the fragile, negatively charged RNA into the body's cells in a safe, effective, and non-toxic way. (Exhibit 8 at 1-2.)

RESPONSE: The allegations of paragraph 16 purport to rely on Exhibit 8, pages 1-2, which speaks for itself. At least because of the scope, breadth, and vagueness of this allegation, Pfizer lacks knowledge or information sufficient to form a belief as to the truth of allegations of Paragraph 16 and therefore denies the allegations.

17. One approach was to develop a lipid system for use with RNA-based therapeutics. These lipids would form a nanoparticle, called a Lipid Nanoparticle or LNP. The LNP would encapsulate and protect the fragile RNA upon administration to the body so the RNA could be delivered to the cells where the RNA would provide its therapeutic effect. Because the RNA is negatively charged, the lipids had to be positively charged (cationic) to create the protective bubble around the RNA. Cationic lipids do not exist in nature, and therefore had to be synthesized. There were toxicity issues with early attempts to use them in therapeutics due to the high dose of LNP needed to be effective.

RESPONSE: Pfizer incorporates by reference its response to Paragraph 16 herein. At least because of the scope, breadth, and vagueness of this allegation, Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 17 and therefore denies the allegations.

18. To harness the full promise and power of LNPs to deliver revolutionary RNA therapies, scientists needed to develop a more potent LNP system that could safely and effectively deliver the RNA to the target cells, and then be metabolized and eliminated from the body.

RESPONSE: Pfizer incorporates by reference its response to Paragraph 16 herein. At least because of the scope, breadth, and vagueness of this allegation, Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 18 and therefore denies the allegations.

19. Alnylam overcame some of the issues associated with earlier versions of LNPs using an in-licensed LNP system containing the cationic lipid compound known as MC3, a highly potent molecule. With MC3, Alnylam developed ONPATTRO®. MC3, while safe and effective, is more stable in the body and thus has a relatively long half-life. Alnylam recognized the need for further improvements in LNP technology and internally embarked on a research program to develop a new class of lipids with improved properties.

RESPONSE: Pfizer admits that Alnylam markets ONPATTRO® which is not an mRNA vaccine. At least because of the scope, breadth, and vagueness of this allegation, Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 19 and therefore denies the allegations.

B. ALNYLAM'S BREAKTHROUGH BIODEGRADABLE LNP TECHNOLOGY FOR DELIVERY OF RNA TO CELLS

20. Over a decade ago, Alnylam scientists solved these pressing issues by inventing a new class of non-natural LNPs comprising a cationic lipid with biodegradable groups (*i.e.*, the Alnylam LNP Technology). LNPs with these biodegradable groups protect the RNA until delivery to inside the cell, and then are metabolized and eliminated from the body ensuring no dose-limiting toxicity. Alnylam's seminal work to create these novel biodegradable LNPs has been employed in potential RNA therapeutics in development and now mRNA-based vaccines.

RESPONSE: At least because of the scope, breadth, and vagueness of this allegation, Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 20 and therefore denies the allegations.

C. THE PATENT-IN-SUIT

21. Alnylam filed a series of provisional and utility patent applications on its novel cationic biodegradable lipids. Utility applications disclosing these novel cationic biodegradable lipids published on February 2, 2012 and August 1, 2013. Twenty-two patents world-wide have issued to Alnylam based on these groundbreaking inventions described in its provisional and utility patent applications.

RESPONSE: Pfizer admits that "Related U.S. Application Data" appears on the face of the '933 Patent, which states, "[c]ontinuation of application No. 16/520,183, filed on Jul. 23, 2019, now Pat. No. 11,071,784, which is a continuation of application No. 14/677,801, filed on Apr. 2, 2015, now Pat. No. 10,369,226, which is a continuation of application No. 13/708,383, filed on Dec. 7, 2012, now Pat. No. 9,061,063." Pfizer further admits that provisional application numbers 61/623,274 and 61/568,133 are cited under "Related U.S. Application Data" for the '933 Patent.

Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 21 and therefore denies the allegations.

22. On February 15, 2022, The United States Patent & Trademark Office issued the '933 Patent, entitled "Biodegradable Lipids for the Delivery of Active Agents." The '933 Patent issued to Alnylam as assignee of the named inventors Martin Maier, Muthusamy Jayaraman, Akin Akinc, Shigeo Matsuda, Pachamuthu Kandasamy, Kallanthottathil G. Rajeev, and Muthiah Manoharan.

RESPONSE: Pfizer admits that the '933 Patent is titled "Biodegradable Lipids for the Delivery of Active Agents" and that an issuance date of February 15, 2022 appears on the face of the '933 Patent. Pfizer admits that on the face of the '933 Patent, Alnylam is listed as an assignee. Pfizer further admits that on the face of the '933 Patent, the names Martin Maier, Muthusamy Jayaraman, Akin Akinc, Shigeo Matsuda, Pachamuthu Kandasamy, Kallanthottathil G. Rajeev, and Muthiah Manoharan are listed as inventors. Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 22 and on that basis denies the allegations.

23. The '933 Patent claims a class of cationic biodegradable lipids that can be used in the formation of LNPs for the delivery of an active agent, including mRNA. Each cationic lipid contains one or more biodegradable group.

RESPONSE: Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the allegations of Paragraph 23 and therefore denies the allegations.

24. Independent claim 18 of the '933 Patent is representative and recites:

> A cationic lipid comprising a primary group and two biodegradable hydrophobic tails, wherein the primary group comprises (i) a head group that optionally comprises a primary, secondary, or tertiary amine, and (ii) a central moiety to which the head group and the two biodegradable hydrophobic tails are directly bonded;
>
> the central moiety is a central carbon or nitrogen atom;
>
> each biodegradable hydrophobic tail independently has the formula -(hydrophobic chain)(biodegradable group)-(hydrophobic chain), wherein the biodegradable group is -OC(O)- or -C(O)O-;

> for at least one biodegradable hydrophobic tail, the terminal hydrophobic chain in the biodegradable hydrophobic tail is a branched alkyl, where the branching occurs at the α-position relative to the biodegradable group and the biodegradable hydrophobic tail has the formula -R^{12}-M^1-R^{13}, where R^{12} is a C_4-C_{14} alkylene or C_4-C_{14} alkenylene, M^1 is the biodegradable group, R^{13} is a branched C_{10}-C_{20} alkyl, and the total carbon atom content of the tail -R^{12}-M^1-R^{13} is 21 to 26;
>
> in at least one hydrophobic tail, the biodegradable group is separated from a terminus of the hydrophobic tail by from 6 to 12 carbon atoms; and
>
> the lipid has a pKa in the range of about 4 to about 11 and a logP of at least 10.1.

(Exhibit 1 at 538:13-8.)

RESPONSE: Pfizer admits that claim 18 of the '933 Patent recites the above claim language, with the caveat that the phrase "each biodegradable…" is missing a hyphen between "(hydrophobic chain)" and "(biodegradable group)." This hyphen is absent in the complaint but present in the '933 Patent and in the claim chart in Exhibit 2. Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 24 and on that basis denies the allegations.

25. The '933 Patent has been owned by Alnylam at all times, is fully maintained, and is valid and enforceable.

RESPONSE: Pfizer admits that on the face of the '933 Patent, Alnylam is listed as an assignee. Pfizer denies that the '933 Patent is valid and enforceable. Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 25 and on that basis denies the allegations.

D. DEFENDANTS' COVID-19 VACCINE

26. On March 17, 2020, Defendant Pfizer Inc. and BioNTech SE ("BioNTech") announced a plan to jointly develop a COVID-19 vaccine. (Exhibit 9 at 2.) A redacted copy of the Collaboration Agreement by and between Pfizer Inc. and BioNTech, dated March 17, 2020, is publicly available. (Exhibit 10.) Under the Collaboration Agreement, Defendant Pfizer Inc. has the sole right in the United States to "market, promote, distribute, offer for sale, sell, have sold, import, have imported, export, have exported or otherwise commercialize" Defendants' COVID-

19 Vaccine. (Exhibit 10, §1.25 (defining "Commercialize"); §1.6 (defining "BioNTech Commercialization Territory"); §1.88 (defining "Pfizer Commercialization Territory").) Under the Collaboration Agreement, Defendant Pfizer Inc. has the right in the United States to "make, produce, manufacture, process, fill, finish, package, label, perform quality assurance testing, release, ship or store, and for the purposes of further manufacturing, distribute, import or export" Defendants' COVID-19 Vaccine or "any component thereof." (*Id.*, §1.75 (defining "Manufacture"); §3.2 ("Licenses for Commercial Manufacturing").)

RESPONSE: Pfizer admits that Exhibit 9 states, "BioNTech SE (Nasdaq: BNTX, 'BioNTech' or 'the Company'), and Pfizer Inc. (NYSE: PFE) today disclosed additional details of their collaboration to advance candidates from BioNTech's mRNA vaccine program, previously announced on March 17, 2020." (Exhibit 9 at 2.) Pfizer admits that Exhibit 10 is a redacted copy of the Collaboration Agreement between Pfizer and BioNTech, dated March 17, 2020. Pfizer admits that the Collaboration Agreement defines "Commercialize" as "to market, promote, distribute, offer for sale, sell, have sold, import, have imported, export, have exported or otherwise commercialize a compound or product." (Exhibit 10, § 1.25 (defining "Commercialize").) Pfizer further admits that the Collaboration Agreement defines "Manufacture" as "to make, produce, manufacture, process, fill, finish, package, label, perform quality assurance testing, release, ship or store, and for the purposes of further Manufacturing, distribute, import or export, a compound or product or any component thereof." (*Id.*, § 1.75 (defining "Manufacture").) Pfizer denies the remaining allegations of Paragraph 26.

27. On April 9, 2020, Defendants provided additional details about this collaboration, including that "BioNTech will contribute multiple mRNA vaccine candidates as part of its BNT162 COVID-19 vaccine program" and that "Pfizer will contribute its leading global vaccine clinical research and development, regulatory, manufacturing and distribution infrastructure and capabilities." (Exhibit 9 at 1.)

RESPONSE: Pfizer admits that Exhibit 9 is dated April 9, 2020 and states, "BioNTech will contribute multiple mRNA vaccine candidates as part of its BNT162 COVID-19 vaccine program" and that "Pfizer will contribute its leading global vaccine clinical research and

development, regulatory, manufacturing and distribution infrastructure and capabilities." (Exhibit 9 at 1.) Pfizer denies the remaining allegations of Paragraph 27.

28. On April 22, 2020, Defendants announced their first clinical trial in Germany of four mRNA vaccine candidates. (Exhibit 11 at 1.) Each vaccine candidate used an LNP to deliver the mRNA. (*Id*.)

RESPONSE: The allegations of Paragraph 18 purport to rely on Exhibit 11 at 1, which speaks for itself. Pfizer denies the remaining allegations of Paragraph 28.

29. On May 5, 2020, Defendants announced that the first doses of Defendants' four vaccine candidates were administered to individuals in the United States as part of Defendants' Phase 1/2 clinical trial. (Exhibit 12 at 1.) Defendants stated that "Pfizer plans to activate its extensive manufacturing network and invest at risk in an effort to produce an approved COVID-19 vaccine as quickly as possible for those most in need around the world. … Pfizer-owned sites in three U.S. states (Massachusetts, Michigan and Missouri) and Puurs, Belgium, have been identified as manufacturing centers for COVID-19 vaccine production, with more sites to be selected." (*Id.* at 2.)

RESPONSE: Pfizer admits that Exhibit 12 is dated May 5, 2020 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) announced today that the first participants have been dosed in the U.S. in the Phase 1/2 clinical trial for the BNT162 vaccine program to prevent COVID-19." (Exhibit 12 at 1.) Pfizer further admits that Exhibit 12 states, "Pfizer plans to activate its extensive manufacturing network and invest at risk in an effort to produce an approved COVID-19 vaccine as quickly as possible for those most in need around the world … Pfizer-owned sites in three U.S. states (Massachusetts, Michigan and Missouri) and Puurs, Belgium have been identified as manufacturing centers for COVID-19 vaccine production, with more sites to be selected." (*Id.* at 2.) Pfizer denies the remaining allegations of Paragraph 29.

30. On July 13, 2020, Defendants announced that the FDA granted Fast Track Designations to two of Defendants' candidate vaccines. (Exhibit 13 at 1.) Peter Honig, Pfizer's Senior Vice President, Global Regulatory Affairs, commented "[w]e look forward to continue working closely with the FDA throughout the clinical development of this program, Project Lightspeed, to evaluate the safety and efficacy of these vaccine candidates." (*Id.* at 1-2.)

RESPONSE: Pfizer admits that Exhibit 13 is dated July 13, 2020 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX, 'BioNTech') today announced that two of the companies' four investigational vaccine candidates from their BNT162 mRNA-based vaccine program (BNT162b1 and BNT162b2) being developed to help protect against SARS-CoV-2 (the virus that causes COVID-19), received Fast Track designation from the U.S. Food and Drug Administration (FDA)." (Exhibit 13 at 1.) Pfizer further admits that Exhibit 13 reflects that "Peter Honig, Senior Vice President, Global Regulatory Affairs, Pfizer" stated, "[w]e look forward to continue working closely with the FDA throughout the clinical development of this program, Project Lightspeed, to evaluate the safety and efficacy of these vaccine candidates." (*Id.* at 1-2.) Pfizer denies the remaining allegations of Paragraph 30.

31. On July 27, 2020, Defendants announced that they had advanced the "nucleoside-modified messenger RNA (modRNA) candidate BNT162b2, which encodes an optimized SARS-CoV-2 full-length spike glycoprotein, at a 30µg dose level in a 2 dose regimen into Phase 2/3 Study." (Exhibit 14 at 1.) Upon information and belief, the vaccine that Defendants selected contains the infringing ALC-0315 cationic lipid.

RESPONSE: Pfizer admits that Exhibit 14 is dated July 27, 2020 and states that Pfizer and BioNTech "advance[d] nucleoside-modified messenger RNA (modRNA) candidate BNT162b2, which encodes an optimized SARS-CoV-2 full-length spike glycoprotein, at a 30µg dose level in a 2 dose regimen into Phase 2/3 Study." (Exhibit 14 at 1.) Pfizer denies that either ALC-0315 (which was not invented by Alnylam), or COMIRNATY® vaccine containing ALC-0315 infringes the '933 Patent or that Alnylam is entitled to damages. Pfizer further denies the remaining allegations of Paragraph 31.

32. On November 18, 2020, Defendants announced that their Phase 3 clinical trial met all primary efficacy endpoints. (Exhibit 15 at 1.) Defendants stated that "[f]our of Pfizer's facilities are part of the manufacturing and supply chain; St. Louis, MO; Andover, MA; and Kalamazoo, MI in the U.S.; and Puurs in Belgium." (*Id.* at 2.)

RESPONSE: Pfizer admits that Exhibit 15 is dated November 18, 2020 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) today announced that, after conducting the final efficacy analysis in their ongoing Phase 3 study, their mRNA-based COVID-19 vaccine candidate, BNT162b2, met all of the study's primary efficacy endpoints." (Exhibit 15 at 1.) Pfizer further admits that Exhibit 15 states, "[f]our of Pfizer's facilities are part of the manufacturing and supply chain; St. Louis, MO; Andover, MA; and Kalamazoo, MI in the U.S.; and Puurs in Belgium." (*Id*. at 2.) Pfizer denies the remaining allegations of Paragraph 32.

33. On December 11, 2020, the FDA authorized Defendants' BNT162b2 candidate with the infringing ALC-0315 cationic LNP (Defendants' COVID-19 Vaccine) for emergency use against COVID-19 in individuals 16 years of age or older. (Exhibit 16 at 1.) Upon information and belief, every dose of Defendants' COVID-19 Vaccine sold pursuant to this emergency use authorization contains the infringing ALC-0315 cationic lipid. Albert Bourla, Chairman and Chief Executive Officer of Pfizer said, "As a U.S. company, today's news brings great pride and tremendous joy that Pfizer has risen to the challenge to develop a vaccine that has the potential to help bring an end to this devastating pandemic. We have worked tirelessly to make the impossible possible, steadfast in our belief that science will win." (Exhibit 16 at 1-2.)

RESPONSE: Pfizer admits that Exhibit 16 is dated December 11, 2020 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) announced today that the U.S. Food and Drug Administration (FDA) has authorized the emergency use of the mRNA vaccine, BNT162b2, against COVID-19 in individuals 16 years of age or older." (Exhibit 16 at 1.) Pfizer further admits that Exhibit 16 reflects that "Albert Bourla, Chairman and Chief Executive Officer, Pfizer" stated, "[a]s a U.S. company, today's news brings great pride and tremendous joy that Pfizer has risen to the challenge to develop a vaccine that has the potential to help bring an end to this devastating pandemic. We have worked tirelessly to make the impossible possible, steadfast in our belief that science will win." (*Id*. at 1-2.) Pfizer denies that ALC-0315, which was not invented by Alnylam, or COMIRNATY® vaccine containing ALC-0315, infringes the '933 Patent. Pfizer further denies the remaining allegations of Paragraph 33.

34. On May 11, 2021, the FDA authorized Defendants' COVID-19 Vaccine for emergency use against COVID-19 in children ages twelve to fifteen. (Exhibit 17 at 1.) Upon information and belief, every dose of Defendants' COVID-19 Vaccine sold pursuant to this emergency use authorization contains the infringing ALC-0315 cationic lipid.

RESPONSE: Pfizer admits that Exhibit 17 is dated May 11, 2021 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) announced today that the U.S. Food and Drug Administration (FDA) has expanded the Emergency Use Authorization (EUA) for their COVID-19 vaccine to include individuals 12 to 15 years of age." (Exhibit 17 at 1.) Pfizer denies that ALC-0315, which was not invented by Alnylam, or COMIRNATY® vaccine containing ALC-0315 infringes the '933 Patent. Pfizer further denies the remaining allegations of Paragraph 34.

35. On August 23, 2021, the FDA approved Defendants' COVID-19 Vaccine under the tradename COMIRNATY® for use in individuals sixteen and over. (Exhibit 18 at 1.) Upon information and belief, every dose of Defendants' COVID-19 Vaccine sold under the tradename COMIRNATY® contains the infringing ALC-0315 cationic lipid.

RESPONSE: Pfizer admits that Exhibit 18 is dated August 23, 2021 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) today announced that the U.S. Food and Drug Administration (FDA) approved the Biologics License Application (BLA) for COMIRNATY (COVID-19 Vaccine, mRNA) to prevent COVID-19 in individuals 16 years of age and older." (Exhibit 18 at 1.) Pfizer admits that its COVID-19 Vaccine is sold under the tradename COMIRNATY®. Pfizer denies that ALC-0315, which was not invented by Alnylam, or COMIRNATY® vaccine containing ALC-0315 infringes the '933 Patent. Pfizer further denies the remaining allegations of Paragraph 35.

36. On October 29, 2021, the FDA authorized Defendants' COVID-19 Vaccine for emergency use against COVID-19 in children ages five to eleven. (Exhibit 19 at 1.) Upon information and belief, every dose of Defendants' COVID-19 Vaccine sold pursuant to this emergency use authorization contains the infringing ALC-0315 cationic lipid.

RESPONSE: Pfizer admits that Exhibit 19 is dated October 29, 2021 and states, "Pfizer Inc. (NYSE: PFE) and BioNTech SE (Nasdaq: BNTX) today announced that the U.S. Food and

Drug Administration (FDA) has authorized for emergency use the Pfizer-BioNTech COVID-19 Vaccine for children 5 through 11 years of age (also referred to as 5 to <12 years)." (Exhibit 19 at 1.) Pfizer denies that ALC-0315, which was not invented by Alnylam, or COMIRNATY® vaccine containing ALC-0315 infringes the '933 Patent. Pfizer further denies the remaining allegations of Paragraph 36.

37. Upon information and belief, on December 16, 2021, the FDA approved a new formulation of Defendants' COVID-19 Vaccine under the tradename COMIRNATY® (gray cap) in individuals sixteen and over. (Exhibit 22 at 1, Exhibit 23; see also Exhibit 4 at 1.) Upon information and belief, Defendants continue to market their prior COVID-19 Vaccine formulation under the tradename COMIRNATY® (purple cap) for use in individuals sixteen and over. (Exhibit 24 at 1.) Upon information and belief, every dose of Defendants' COVID-19 Vaccine sold under the tradename COMIRNATY® (gray cap and purple cap) contains the infringing ALC-0315 cationic lipid.

RESPONSE: Pfizer admits that Exhibit 22 appears to be a letter from the FDA dated December 16, 2021, which states, "[w]e have approved your request submitted and received on November 18, 2021, to supplement your Biologics License Application (BLA) under section 351(a) of the Public Health Service Act for COVID-19 Vaccine, mRNA (COMIRNATY®), to include a new 30 microgram dose formulation (Tris/Sucrose) of COMIRNATY® manufactured at the Pfizer Manufacturing Belgium NV, Puurs, Belgium (Pfizer, Puurs) facility." (Exhibit 22 at 1.)

Pfizer further admits that Exhibits 4 and 24 purport to be the prescribing information for COMIRNATY® (COVID-19 Vaccine, mRNA).

Pfizer denies that ALC-0315, which was not invented by Alnylam, or COMIRNATY® vaccine (gray cap and purple cap) containing ALC-0315 infringes the '933 Patent. Pfizer further denies the remaining allegations of Paragraph 37.

38. On February 8, 2022, Defendant Pfizer Inc. stated that it expected 2022 worldwide revenue of $32,000,000,000 for Defendants' COVID-19 Vaccine. (Exhibit 6 at 29.) Defendant Pfizer Inc.'s reported revenues suggest that U.S. sales in 2021 accounted for approximately 21% of the sales of Defendants' COVID-19 Vaccine in 2021. (*Id.* at 35.)

RESPONSE: Pfizer admits that Exhibit 6 states that "[a]s of February 8, 2022, [Pfizer] forecasted approximately $32 billion in revenues for Comirnaty in 2022, with gross profit to be split evenly with BioNTech, which includes doses expected to be delivered in fiscal 2022 under contracts signed as of late-January 2022." (Exhibit 6 at 29.) Pfizer denies the remaining allegations of Paragraph 38.

E. ALNYLAM'S PATENTED LNP TECHNOLOGY IS ESSENTIAL TO DEFENDANTS' COVID-19 VACCINE

39. The patented Alnylam LNP Technology is essential to the efficacy and safety of Defendants' COVID-19 Vaccine. mRNA is very delicate and subject to rapid degradation by various enzymes upon administration. (Exhibit 8 at 2.) The large, negatively-charged mRNA strands also struggle to pass through the protective lipid membranes of cells. (*Id.*) Thus, to be effective, the mRNA strands require a delivery mechanism that can ensure that the mRNA strands are not degraded before delivery to the cell and can penetrate the cell. In addition, the LNP needs to be biodegradable, *i.e.*, such that the LNPs are metabolized and eliminated after successful mRNA delivery to the cells, so as to enhance safety.

RESPONSE: Pfizer denies that any of the technology claimed by the '933 Patent is included in COMIRNATY® vaccine. Pfizer further denies that any technology claimed by the '933 Patent is essential to the efficacy and safety of COMIRNATY® vaccine. Pfizer lacks the knowledge or information sufficient to form a belief as to the truth of the remaining allegations of Paragraph 39 and on that basis denies the allegations.

40. Regarding these LNPs, Defendant Pfizer Inc.'s website states "[t]his tiny fat glob, known as a functional lipid, is actually one of four lipids that make up the lipid nanoparticles that go into the vaccine. *Without these lipid nanoparticles, in fact, there could be no Pfizer-BioNTech mRNA vaccine*. That's because mRNA, which is the genetic material that teaches our cells to make the protein that will help our immune systems produce antibodies that helps to protect us from COVID-19, is incredibly delicate." (Exhibit 20 (emphasis added) at 2.)

RESPONSE: Pfizer admits that Exhibit 20 states, "[t]his tiny fat glob, known as a functional lipid, is actually one of four lipids that make up the lipid nanoparticles that go into the vaccine. Without these lipid nanoparticles, in fact, there could be no Pfizer-BioNTech mRNA vaccine. That's because mRNA, which is the genetic material that teaches our cells to make the

protein that will help our immune systems produce antibodies that helps to protect us from COVID-19, is incredibly delicate." (Exhibit 20 at 2.) Pfizer denies that any of the technology claimed by the '933 Patent is included in COMIRNATY® vaccine. Pfizer denies the remaining allegations of Paragraph 40.

DEFENDANTS' INFRINGING ACTIVITIES

41. On information and belief, Defendants and/or their end users employ in their COVID-19 Vaccine ALC-0315, which meets every limitation of at least claims 18, 19, 21, 22, and 24-27 of the '933 Patent.

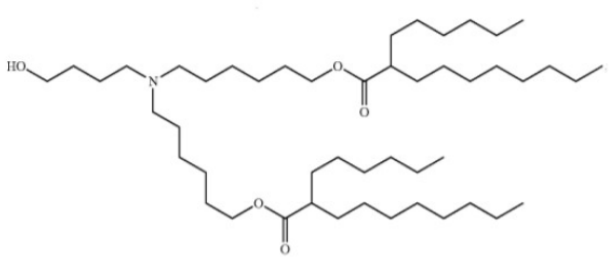
RESPONSE: Pfizer admits that COMIRNATY® vaccine contains ALC-0315, which was not invented by Alnylam. Pfizer denies that ALC-0315, which was not invented by Alnylam, meets every limitation of claims 18, 19, 21, 22, and 24-27 (or any other claims) of the '933 Patent. Pfizer further denies the remaining allegations of Paragraph 41.

42. The Prescribing Information for COMIRNATY® states that each dose contains ((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate). (Exhibit 4 at 15.) Upon information and belief, this document was prepared by Defendants and accepted by the FDA for distribution to providers of Defendants' COVID-19 Vaccine. Upon information and belief, 4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate) is known as ALC-0315.

RESPONSE: Pfizer admits that Exhibit 4 is the prescribing information for COMIRNATY® (COVID-19 Vaccine, mRNA), which states, "[e]ach 0.3 mL dose of the COMIRNATY supplied in multiple dose vials with gray caps and labels with gray borders also includes the following ingredients: lipids (0.43 mg ((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate), 0.05 mg 2-(polyethylene glycol 2000)-N,N-ditetradecylacetamide, 0.09 mg 1,2-distearoyl-sn-glycero-3-phosphocholine, and 0.19 mg cholesterol), 0.06 mg tromethamine, 0.4 mg tromethamine hydrochloride, and 31 mg sucrose." (Exhibit 4 at 15.) Pfizer admits that the prescribing information in Exhibit 4 was prepared by Pfizer and reviewed by the FDA. Pfizer further admits that 4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-

hexyldecanoate) is known as ALC-0315 and was not invented by Alnylam. Pfizer denies the remaining allegations of Paragraph 42.

43. Upon information and belief, ALC-0315 has the chemical structure depicted just below:



(Exhibit 21 at 8.)

RESPONSE: Defendants admit that Exhibit 21 at 8 depicted in Paragraph 43 purports to depict the structure above. (Exhibit 21 at 8.)

44. Upon information and belief, ALC-0315 is in every dose of the COVID-19 Vaccine that Defendants have made, offered for sale, and sold, and will continue to do so.

RESPONSE: Pfizer admits that COMIRNATY® contains ALC-0315, which was not invented by Alnylam. Pfizer denies the remaining allegations of Paragraph 44.

45. Attached as Exhibit 2 is a preliminary claim chart describing Defendants' infringement of claims 18, 19, 21, 22, and 24-27 of the '933 Patent. Exhibits 4, 5, 21, 25, and 26 are supporting documents for the chart. The claim chart is not intended to limit Alnylam's right to modify the chart or allege that other activities of Defendants infringe the identified claim or any other claims of the '933 Patent or any other patents.

RESPONSE: Pfizer admits that Exhibit 2 of the Complaint purports to be Plaintiff's preliminary claim chart for claims 18, 19, 21, 22, and 24-27 of the '933 Patent. Pfizer denies infringement of any claim of the '933 Patent and any remaining allegations of Paragraph 45.

46. Defendants have known of the '933 Patent since at least as early as February 15, 2022, when the '933 Patent issued.

RESPONSE: Pfizer admits that they have known of the '933 Patent since it issued on February 15, 2022. Pfizer denies the remaining allegations of Paragraph 46.

FIRST CAUSE OF ACTION
(Infringement of the '933 Patent)

47. Alnylam realleges and incorporates by reference the allegations contained in the foregoing paragraphs.

RESPONSE: Pfizer incorporates by reference its responses contained in the foregoing paragraphs.

48. On information and belief, Defendants have infringed and will continue to infringe at least one of the asserted claims of the '933 Patent, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, or offering to sell within the United States or importing into the United States Defendants' COVID-19 Vaccine containing ALC-0315 without authority.

RESPONSE: Pfizer denies the allegations of Paragraph 48.

49. Defendants without authority have infringed and will continue to infringe at least one of the asserted claims of the '933 Patent pursuant to 35 U.S.C. § 271(b) by actively inducing the making, using, selling, or offering for sale within the United States or importing into the United States Defendants' COVID-19 Vaccine containing ALC-0315. Each Defendant intends that the other Defendant makes, uses, sells, offers to sell, distributes, exports, and/or imports Defendants' COVID-19 Vaccine and/or its components comprising the infringing ALC-0315 biodegradable lipid with the knowledge and specific intent that the other Defendant will directly infringe Alnylam's '933 Patent. Defendants further intend that each end user, distributor, importer and/or exporter make, use, sell, offer to sell, distribute, export, and/or import Defendants' COVID-19 Vaccine and/or its components comprising the infringing ALC-0315 biodegradable lipid with the knowledge and specific intent that such end user, distributor, importer, and/or exporter end-users directly infringe Alnylam's '933 Patent.

RESPONSE: Pfizer denies the allegations of Paragraph 49.

50. Defendants' infringement has damaged and will continue to damage Alnylam, which is entitled to recover the damages resulting from Defendants' wrongful acts in an amount to be determined at trial, and in any event no less than a reasonable royalty.

RESPONSE: Pfizer denies the allegations of Paragraph 50.

RESPONSE TO PRAYER FOR RELIEF

51. Pfizer denies all allegations not expressly admitted herein. The remainder of Plaintiff's Complaint is a prayer for relief, and does not require a response. To the extent any

response is required, Pfizer denies that Plaintiff is entitled to any of the remedies or relief included in clauses (A) though (E) of Plaintiff's Prayer for Relief.

DEFENDANTS' AFFIRMATIVE DEFENSES

Further answering the Complaint, Pfizer asserts the following defenses without assuming any burden that they would not otherwise have, including without admitting or acknowledging that they bear the burden of proof as to any of them. Pfizer reserves the right to amend its answer with additional defenses as further information is obtained.

FIRST AFFIRMATIVE DEFENSE
(NON-INFRINGEMENT OF THE '933 PATENT)

Pfizer has not infringed any claim of the '933 Patent, either directly or indirectly.

SECOND AFFIRMATIVE DEFENSE
(INVALIDITY OF THE '933 PATENT)

Each and every claim of the '933 Patent is invalid for failing to meet one or more of the requisite conditions of patentability specified in 35 U.S.C. §§ 102, 103 and/or 112.

THIRD AFFIRMATIVE DEFENSE
(PATENT MISUSE)

Plaintiff has sought to enforce the '933 Patent for products and acts Plaintiff knows are outside the claims of the '933 Patent, rendering the '933 Patent unenforceable on account of patent misuse.

FOURTH AFFIRMATIVE DEFENSE
(FAILURE TO STATE A CLAIM)

Plaintiff's Complaint fails to state a claim on which relief can be granted.

FIFTH AFFIRMATIVE DEFENSE
(NO COSTS)

Plaintiff is barred by 35 U.S.C. § 288 from recovering any costs associated with this action.

SIXTH AFFIRMATIVE DEFENSE
(ADDITIONAL DEFENSES)

Pfizer reserves the right to assert further defenses in the event that discovery indicates such defenses would be appropriate.

COUNTERCLAIMS

Pursuant to Rule 13 of the Federal Rules of Civil Procedure, Counterclaimants Pfizer Inc. ("Pfizer") and Pharmacia & Upjohn Co. LLC ("Pharmacia") (collectively, "Pfizer" or "Defendants") and BioNTech SE and BioNTech Manufacturing GmbH (collectively, "BioNTech" and with Defendants, "Counterclaimants"), by and through their attorneys, bring the following Counterclaims against Alnylam Pharmaceuticals, Inc. ("Plaintiff" or "Alnylam" or "Counterclaim-Defendant"):

1. Counterclaimants on personal knowledge as to their own acts, and on information and belief as to all others based on their own and their attorneys' investigation, and without admitting the allegations of Plaintiff other than those expressly admitted herein, bring the following counterclaims against Alnylam for declaratory judgment that U.S. Pat. No. 11,246,933 (the "'933 Patent" or "patent-in-suit") is invalid and not infringed by Counterclaimants. Additionally, Defendants bring the following Counterclaim that the '933 Patent is unenforceable for patent misuse.

2. Counterclaimants repeat and incorporate by reference each of the foregoing paragraphs of Pfizer's Answer and Affirmative Defenses to the Complaint, as if fully set forth herein.

THE PARTIES

3. Pfizer is a corporation organized and existing under the laws of the State of Delaware, with its principal place of business at 235 East 42nd Street, New York, New York 10017.

4. Pharmacia is a corporation organized and existing under the laws of the state of Delaware, with a principal place of business at 7000 Portage Road Kalamazoo, MI 49001. Pharmacia is a subsidiary of Defendant Pfizer Inc.

5. BioNTech SE is a corporation organized and existing under the laws of Germany with a principal place of business at An der Goldgrube 12, D-55131 Mainz, Germany.

6. BioNTech Manufacturing GmbH ("BioNTech Manufacturing") is a corporation organized and existing under the laws of Germany with a principal place of business at An der Goldgrube 12, D-55131 Mainz, Germany. BioNTech Manufacturing is the applicant for the Biologics License Application (BLA) for COMIRNATY® (COVID-19 Vaccine, mRNA) in partnership with Pfizer.

7. According to its Complaint (D.I. 1), Alnylam is a corporation organized and existing under the laws of the State of Delaware, with a principal place of business at 675 West Kendall Street, Henri A. Termeer Square, Cambridge, Massachusetts 02142. According to its Complaint, Alnylam is the owner by assignment of the '933 Patent.

JURISDICTION AND VENUE

8. This Court has subject matter jurisdiction over these Counterclaims for declaratory judgment pursuant to 28 U.S.C. §§ 1331, 1338(a), 2201, and 2202 based on an actual controversy

among the parties arising under the Patent Laws of the United States, 35 U.S.C. § 1, *et seq*.

9. Personal jurisdiction over Alnylam is proper because, *inter alia*, according to its Complaint, Alnylam is a corporation organized and existing under the laws of the State of Delaware, and because Alnylam has consented to the personal jurisdiction of the Court by commencing its action for patent infringement in this Judicial District, as set forth in its Complaint.

10. Venue is proper in this judicial district under 28 U.S.C. §§ 1391 and 1400 based at least on the fact that, according to its Complaint, Alnylam is a corporation organized and existing under the laws of the State of Delaware, and by virtue of the filing by Alnylam of this lawsuit in this venue.

11. There is an actual justiciable controversy among the parties concerning non-infringement and invalidity of the '933 Patent.

CASE AND CONTROVERSY

12. The '933 Patent, entitled "Biodegradable Lipids for the Delivery of Active Agents," states an issue date of February 15, 2022, and names as inventors Martin Maier, Muthusamy Jayaraman, Akin Akinc, Shigeo Matsuda, Pachamuthu Kandasamy, Kallanthottathil G. Rajeev, and Muthiah Manoharan. Upon information and belief, a true and correct copy of the '933 Patent is attached to the Complaint as Exhibit 1 (D.I. 1-1).

13. Upon information and belief, Alnylam is the assignee of all right, title, and interest in the '933 Patent.

14. An actual, substantial, and justifiable controversy, within the meaning of 28 U.S.C. §§ 2201 and 2202, exists between Pfizer and Alnylam.

15. Prior to filing suit against Defendants, Alnylam contacted both BioNTech and Pfizer shortly after the '933 Patent issued alleging that the '933 Patent covers ALC-0315. In a

communication to BioNTech, dated February 28, 2022, Steven A. Bossone, Alnylam's Senior Vice President and Chief Intellectual Property Officer, alleged that "Alnylam is the pioneer and inventor of a broad class of biodegradable lipids including ALC-0315 in work beginning well over a decade ago. We've previously provided charts to Acuitas detailing how the claims of the Alnylam '933 patent read on ALC-0315, which you may have already seen, but if not we are fine with Acuitas providing these to you." Further, Alnylam sought a "standstill" agreement with BioNTech that would have prohibited any party from filing suit through the end of April 2022.

16. Because of Alnylam's accusations that "the claims of the Alnylam '933 patent read on ALC-0315," BioNTech faces the risk of a suit for infringement of one or more claims of the '933 Patent. Indeed, Alnylam has actually filed suit against Pfizer in the present suit. Alnylam has also filed suit alleging infringement of the '933 Patent by the other major mRNA COVID-19 vaccine manufacturer in the United States. *See Alnylam Pharmaceuticals, Inc. v. Moderna, Inc., et al.*, C.A. No. 22-335-CFC (D. Del.).

17. BioNTech faces similar and separate risks of suit against it by Alnylam, at least because BioNTech Manufacturing is the applicant for the BLA for COMIRNATY® (COVID-19 Vaccine, mRNA) in partnership with Pfizer, because BioNTech Manufacturing engages in the manufacture of COMIRNATY® vaccine with Pfizer, and because BioNtech's and Pfizer's collaboration agreement is based on both Pfizer's and BioNTech's intent that Pfizer commercialize COMIRNATY® vaccine in the United States.

18. In view of the foregoing, an actual controversy has also arisen between BioNTech and Alnylam with respect to the non-infringement and invalidity of the relevant claims of the '933 Patent.

19. This controversy is of sufficient immediacy and reality to warrant the issuance of a declaratory judgment.

20. Counterclaimants seek a declaration that the '933 Patent is not, and has not been, infringed and the '933 Patent is invalid. Pfizer additionally seeks a declaration that the '933 Patent is unenforceable.

BACKGROUND

21. In December of 2019, it was discovered that an outbreak of pneumonia among people who had visited the Huanan Seafood Wholesale Market in Wuhan, China was caused by a novel coronavirus, eventually designated by the World Health Organization ("WHO") as SARS-CoV-2 with the disease it causes reclassified as Coronavirus disease 2019 ("COVID-19").

22. COVID-19 quickly spread around the world and tore through populations that were immunologically naïve, threatening the collapse of the healthcare system and loss of life at scales not seen since the advent of modern medicine. What began first as small area lockdowns to prevent the transmission of disease and temporary stay at home orders eventually became society altering restrictions. Many saw the only path out of the pandemic as the development successful vaccines against the disease.

23. BioNTech first began working on messenger RNA ("mRNA")-based clinical vaccine candidates in the early- to mid-2010s, earning itself a reputation as an industry leader in mRNA technology. BioNTech partnered with several companies and research institutes to develop mRNA-based clinical vaccines.

24. BioNTech also licensed technology from multiple partners. In particular, BioNTech had licensed a synthetic lipid known as ALC-0315, otherwise known by its IUPAC

name [4-hydroxybutyl)azanediyl]di(hexane-6,1-diyl) bis(2-hexyldecanoate) from Acuitas Therapeutics Inc. ("Acuitas"), formerly known as Alcana Technologies.

25. On January 10, 2020, the Chinese Center for Disease Control published the genetic sequence of SARS-CoV-2.

26. BioNTech scientists set to work on developing a COVID-19 disease vaccine. BioNTech was able to do so by building on its existing development work and experience with mRNA-based clinical vaccine candidates. BioNTech had identified a product candidate—then known as BNT162—as a potential mRNA-based vaccine that would protect against COVID-19.

27. In March 2020, Pfizer and BioNTech began a collaborative effort focused on bringing a COVID-19 disease vaccine to market. The vaccine that ultimately emerged from this partnership was a novel mRNA vaccine now known as COMIRNATY®.

28. Clinical trials of Pfizer/BioNTech vaccine candidates began in late April of 2020, with preliminary results demonstrating their safety and efficacy published in merely six months.

29. On November 20, 2020, Pfizer, on behalf of itself and BioNTech, submitted its clinical trial data as part of its Emergency Use Authorization ("EUA") request to the Food and Drug Administration ("FDA") for administering its mRNA vaccine to people 16 years of age and older.

30. On December 10, 2020, the FDA granted the first EUA for a COVID-19 disease vaccine to Pfizer and BioNTech's mRNA vaccine with vaccinations rolling out immediately thereafter, reflecting the fastest development of a vaccine in history.

31. The FDA provided Pfizer and BioNTech's vaccine with full approval on August 23, 2021, upon which it was given the trade name, COMIRNATY®.

32. Since being given EUA, millions of doses of COMIRNATY® vaccine have been administered worldwide, resulting in countless number of lives saved while easing the strain of an otherwise uncontrollable pandemic.

33. On March 17, 2022, Alnylam sued Defendants for infringement of the '933 Patent, alleging that Defendants had incorporated the claimed subject matter of the '933 Patent into COMIRNATY® vaccine in an infringing manner.

34. On information and belief, Alnylam's efforts with Vir Biotechnology to develop a COVID-19 vaccine proved unsuccessful and were discontinued.

35. Alnylam's alleged lipid technology is not a COVID vaccine.

36. Alnylam's alleged lipid technology has never been included in a COVID vaccine.

37. In view of the foregoing, a conflict of asserted rights has arisen between Counterclaimants and Alnylam with respect to the non-infringement and invalidity. Additionally, a further conflict exists between Pfizer and Alynlam due to misuse of the relevant claims of the '933 Patent.

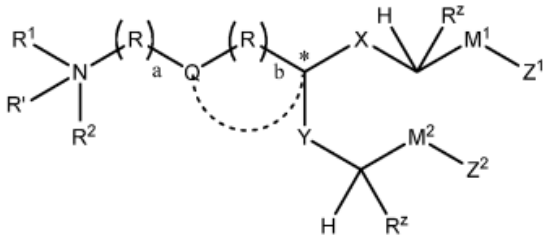
PROSECUTION HISTORY OF U.S. PAT. NO. 11,246,933 FAMILY

38. The '933 Patent claims priority back to three previous U.S. Patent Applications and two provisional patent applications.

39. Alnylam filed its first provisional patent application in this family, U.S. Provisional Patent Application No. 61/568,133 (the "'133 Application"), on December 7, 2011.

40. The claims of the '133 Application cover both specific compounds and compounds defined by formulas, all of which are compounds with nitrogen containing head and carbon based central moieties, represented by (*) in the formula below.

41. The compound defined by Formula (I) recited by claim 1 is representative:



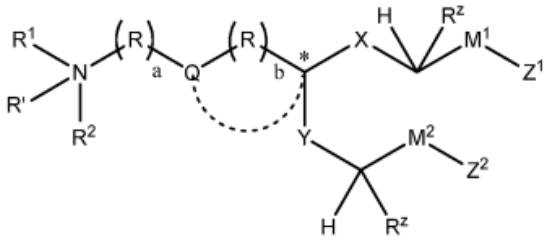
Formula (I)

42. The ’133 Application expired on December 9, 2012.

43. Alnylam filed a second provisional patent application in this family, U.S. Provisional Patent Application No. 61/623,274 (the “’274 Application”), on April 12, 2012.

44. The claims of the ’274 Application cover both specific compounds and compounds defined by formulas, all of which are compounds with nitrogen containing head and carbon based central moieties. The carbon based central moiety is represented by (*) in the formula below.

45. The compound defined by Formula (I) recited by claim 1 is representative:



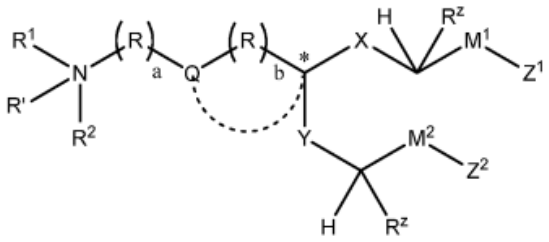
Formula (I)

46. The ’274 Application expired on April 14, 2013.

47. Alnylam filed its first non-provisional patent application in this family, U.S. Patent Application No. 13/708,383 (the “’383 Application”), on December 7, 2012.

48. The claims of the ’383 Application cover both specific compounds and compounds defined by formulas, all of which are compounds with nitrogen containing head groups and carbon based central moieties. The carbon based central moiety is represented by (*) in the formula below.

49. The compound defined by Formula (I) recited by claim 1 is representative:

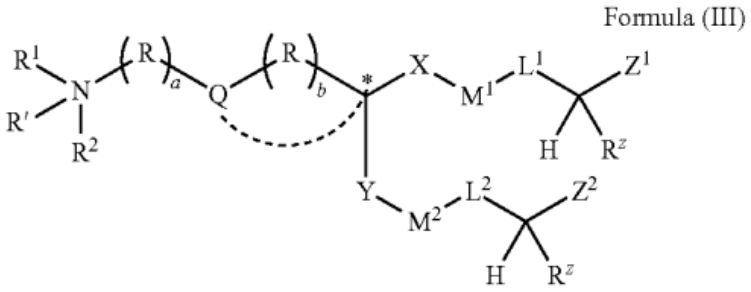


Formula (I)

50. The '383 Application issued as U.S. Pat. No. 9,061,063 (the "'063 Patent"), on June 23, 2015.

51. The claims of the '063 Patent cover both specific compounds and compounds defined by formulas, all of which are compounds with nitrogen containing head groups and carbon based central moieties. The carbon based central moiety is, represented by (*) in the formula below.

52. The compound defined by Formula (III) recited by claim 1 is representative:

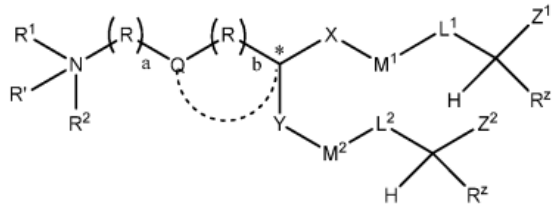


Formula (III)

53. Alnylam filed its second non-provisional patent application in this family, U.S. Patent Application No. 14/677,801 (the "'801 Application"), on April 2, 2015.

54. The claims of the '801 Application cover both specific compounds and compounds defined by formulas, all of which are compounds with nitrogen containing head groups and carbon based central moieties. The carbon based central moiety is represented by (*) in the formula below.

55. The compound defined by Formula (III) recited by claim 1 is representative:



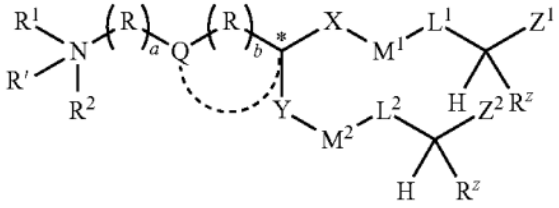
Formula (III)

56. The ’801 Application issued as U.S. Pat. No. 10,369,226 (the “’226 Patent”), on August 6, 2019.

57. The claims of the ’226 Patent cover both specific compounds and compounds defined by formulas, all of which are compounds with nitrogen containing head groups and carbon based central moieties. The carbon based central moiety is represented by (*) in the formula below.

58. The compound defined by Formula (III) recited by claim 1 is representative:

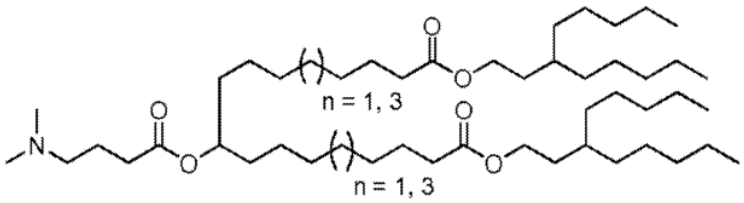
Formula (III)



59. Alnylam filed a third non-provisional patent application in this family, U.S. Patent Application No. 16/520,183 (the “’183 Application”), on July 23, 2019.

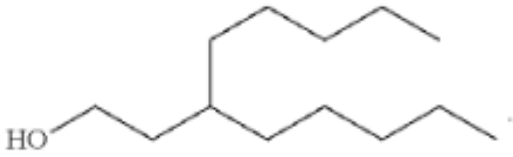
60. The claims of the ’183 Application cover processes for creating and individual compounds defined by formulas, all of which are compounds with nitrogen containing head groups and carbon based central moieties.

61. The compound generated by the process of claim 39 is representative:



62. The ’183 Application issued as U.S. Pat. No. 11,071,784 (the “’784 Patent”), on July 27, 2021.

63. The claims of the ’784 Patent recite only a single non-biodegradable compound, as shown below:



64. The compound claimed by the ’784 Patent is a precursor molecule that is used in the synthesis of the compound described in claim 39 of the ’183 Application.

65. On April 9, 2021, the structure of each of the lipid components of the LNP included in COMIRNATY® vaccine, including ALC-0315, was published in Schoenmaker *et al*., “mRNA-Lipid Nanoparticle COVID-19 Vaccines: Structure and Stability” 601 INTERNATIONAL J. OF PHARMACEUTICS 1-13, at 8 (2021).

66. Immediately after disclosure of the structure of the lipids used in COMIRNATY® vaccine, Alnylam filed a fourth non-provisional patent application in this family, U.S. Patent Application No. 17/302,311 (the “’311 Application”) on April 29, 2021 which issued as the patent-in-suit on February 15, 2022.

67. The '311 Application is the first application in this family which, on its face, purports to claim a compound that does not have a nitrogen containing head group or a carbon based central moiety.

68. For instance, claims 1 and 3 as originally filed read:

> 1. A cationic lipid comprising a primary group and two biodegradable hydrophobic tails, wherein (a) the primary group comprises a protonatable group having a pK_a of from about 4 to about 13, (b) the cationic lipid has an *in vivo* half life ($t_{1/2}$) of less than about 3 hours, and (c) at least one of the hydrophobic tails has the formula –(hydrophobic chain)-(biodegradable group)-(hydrophobic chain) where the terminal hydrophobic chain in the hydrophobic tail is a branched alkyl group, where the branching occurs at the *a*-position relative to the biodegradable group.
>
> 2. The cationic lipid of claim 1, wherein the primary group includes (i) a head group, and (ii) a central moiety to which both the biodegradable hydrophobic tails are directly bonded.
>
> 3. The cationic lipid of claim 2, wherein the central moiety is selected from the group consisting of a central carbon atom, a central nitrogen atom, a central carbocyclic group, a central aryl group, a central heterocyclic and a central heteroaryl group.

69. The '311 Application was filed after the structure of the cationic lipid incorporated into COMIRNATY® vaccine was published.

COUNT I – DECLARATION OF NON-INFRINGEMENT

70. Counterclaimants incorporate by reference paragraphs 1 through 69 of its Counterclaims as if fully set forth herein.

71. This Counterclaim arises under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq*., and the Declaratory Judgment Act, 28 U.S.C. 28 §§ 2201 and 2202. An actual, substantial,

and continuing justiciable controversy having adverse legal interest of sufficient immediacy and reality to warrant the issuance of a declaration of rights by the Court exists between Counterclaimants and Alnylam concerning infringement of the '933 Patent.

72. Alnylam has accused Counterclaimants of activities that it claims infringe the '933 Patent.

73. Counterclaimants do not and have not infringed, either directly or indirectly, any claim of the '933 Patent.

74. Counterclaimants are entitled to a declaratory judgment from this Court that they do not and have not infringed any claim of the '933 Patent.

75. This is an exceptional case under 35 U.S.C. § 285, entitling counterclaimants to an award of attorneys' fees incurred in connection with this matter.

COUNT II – DECLARATION OF INVALIDITY

76. Counterclaimants incorporate by reference Paragraphs 1 through 75 of its Counterclaims as if fully set forth herein.

77. Claims 18, 19, 21, 22, and 24-27 of the '933 Patent are invalid for failure to satisfy one or more of the provisions set forth in 35 U.S.C. §§ 100 *et seq*., including, without limitation, the requirements of 35 U.S.C. §§ 101, 102, 103 and/or 112 and/or any other judicially created requirements for patentability and enforceability of patent and/or in view of the defenses recognized in 35 U.S.C. § 282.

78. Counterclaimants are entitled to a declaratory judgment from this Court that the '933 Patent is invalid.

COUNT III – DECLARATION OF PATENT MISUSE (PFIZER ONLY)

79. Defendants incorporate by reference Paragraphs 1 through 78 of their Counterclaims as if fully set forth herein.

80. Alnylam has sought to enforce and/or license the patents-in-suit for products and acts they know are outside the claims of the patents-in-suit.

81. All family members of the ’933 Patent family prior to the filing of the application that resulted in the ’933 Patent have claims directed to compounds with a nitrogen containing head group.

82. All structures in the ’933 Patent disclose lipids that have nitrogen in their head groups, unlike the Accused Lipid.

83. Alnylam only began prosecuting the claims of the ’933 Patent, directed to a class of compounds and silent on their face as to the presence of nitrogen in the head group, after the lipid components of COMIRNATY® vaccine were published and years after the alleged priority date of the ’933 Patent.

84. There is no support for the claims of the ’933 Patent in its specification.

85. Alnylam’s conduct in seeking to license and enforce the ’933 Patent against products and acts it knows to be outside the scope of the claims of the patent-in-suit, and outside the scope of what Alnylam actually invented, is an attempt to seek an improper economic benefit.

86. Alnylam has engaged in a course of conduct that seeks to broaden the scope of the ’933 Patent with anticompetitive effect.

87. Alnylam’s misuse of the patent-in-suit renders the ’933 Patent unenforceable.

RELIEF REQUESTED

WHEREFORE, Counterclaimants respectfully request that the Court enter a Judgment and Order in their favor and against Plaintiff as follows:

(a) Dismissing Alnylam's Complaint with prejudice and denying each and every prayer for relief contained therein;

(b) Declaring that Counterclaimants do not infringe any claim of the '933 Patent;

(c) Declare that the manufacture, use, offer to sell, and sale of COMIRNATY® vaccine within the United States, and its importation into the United States, does not infringe any claim of the '933 Patent;

(d) Declaring that the claims of the '933 Patent are invalid;

(e) Declaring that the '933 Patent is unenforceable against Defendants under the doctrine of patent misuse;

(f) Declaring that Alnylam and its agents, representatives, attorneys, and those persons in active concert or participation with them who receive actual notice thereof, be preliminarily and permanently enjoined from threatening or initiating infringement litigation against Counterclaimants or any of their customers, dealers, or suppliers, or any prospective or present sellers, dealers, distributors, or customers of Counterclaimants, or charging any of them either orally or in writing with infringement of the '933 Patent.

(g) Awarding Counterclaimants their attorneys' fees, together with costs and disbursements, including because this case is exceptional under 35 U.S.C. § 285; and

(h) Awarding such other and further relief as the Court deems justified.

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