

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHANGHAI HONGENE BIOTECH CORP.,
Petitioner,

v.

CHEMGENES CORP.,
Patent Owner.

IPR2023-00862
Patent 8,541,569 B2

Before JOHN G. NEW, ZHENYU YANG, and CYNTHIA M. HARDMAN,
Administrative Patent Judges.

YANG, *Administrative Patent Judge.*

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Shanghai Hongene Biotech Corp. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) seeking *inter partes* review of claims 1 and 2 of U.S. Patent No. 8,541,569 B2 (Ex. 1001, “the ’569 patent”). ChemGenes Corp. (“Patent Owner”) did not file a Preliminary Response.

We have authority under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

For the reasons provided below, we determine Petitioner has satisfied the threshold requirement set forth in 35 U.S.C. § 314(a). Accordingly, we institute *inter partes* review of all challenged claims based on all grounds raised in the Petition.

A. Related Matters

According to the parties, Patent Owner asserted the ’569 patent against Petitioner in Case No. 1-22-cv-10290 (D. Mass.) but later voluntarily dismissed the district court action. Pet. vi; Paper 4, 2.

Petitioner also filed IPR2023-00490 and IPR2023-00875, challenging two other patents asserted in the district court action. Paper 4, 2.

B. The ’569 Patent

The ’569 patent “provides building blocks and methods for synthesizing very pure RNA in a form that can efficiently be modified at the 3’ end.” Ex. 1001, Abstract.

The ’569 patent explains that, at the time of its alleged invention, defined sequence RNA synthesis in the 3’→5’ direction was well established. *Id.* at 1:20–50. If the synthetic RNA requires a modification or

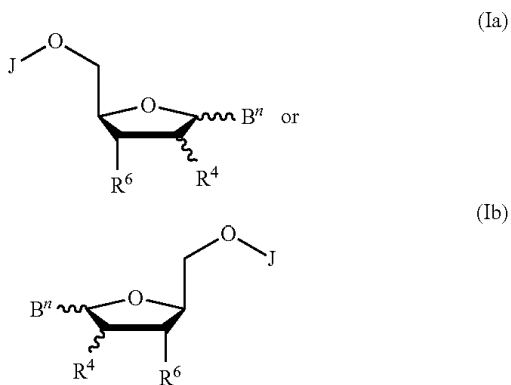
labeling of the 3'-end, however, "the 3'→5' synthesis methodology are challenging, difficult to synthesize and generally result in low coupling efficiency and lower purity of the final oligonucleotide." *Id.* at 1:51–57. According to the '569 patent, "new synthetic methodologies are needed to synthesize RNA molecules quickly, and cleanly and in a form that allows for modification at the 3' end." *Id.* at 1:58–60.

The '569 patent discloses reverse RNA monomer phosphoramidites for RNA synthesis in 5'→3' direction, which leads to "very clean oligo synthesis that allows for the introduction of various modifications at the 3'-end cleanly and efficiently." *Id.* at 1:66–2:3.

C. Illustrative Claim

Claim 1 is illustrative of the claimed subject matter. We reproduce below only those parts relevant to our present analysis.

1. A compound of Formula Ia or Ib:



or a salt thereof, wherein:

J is H . . . ;

. . .

R⁴ is a -halo . . . ;

. . .

R⁶ is —H or —O—Z;

. . .

Bⁿ is hydrogen or an optionally substituted nucleobase optionally functionalized at each exocyclic amine with an amine protecting group, wherein the nucleobase is selected from: . . . thymine, . . . 5-methylcytosine. . .

. . .

Ex. 1001, 111:22–114:33.

D. Asserted Challenges to Patentability

Petitioner asserts the following challenges to patentability:

Claim Challenged	35 U.S.C. §	Reference(s)/Basis
1	102(b)	Aerschot ¹
2	102(b)	Aerschot

Petitioner also relies on the declaration of Phil S. Baran, Ph.D., as support for its Petition. Ex. 1003.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, we construe a claim term “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b).” 37 C.F.R. § 42.100(b) (2020). Under that standard, the words of a claim “are generally given their ordinary and customary meaning,” which is “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

¹ Aerschot et. al., 3'-Fluoro-2',3'-dideoxy-5-chlorouridine: Most Selective Anti-HIV1 Agent among a Series of New 2'- and 3'-Fluorinated 2',3'-Dideoxynucleoside Analogues, 32 J. MED. CHEM. 1742–49 (1989) (Ex. 1004, “Aerschot”).

Petitioner argues that, for purposes of this Decision, no claim term needs specific construction beyond its plain and ordinary meaning. Pet. 12. Claim terms need only be construed to the extent necessary to resolve the controversy. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). On this record and for purposes of this Decision, we see no need to address the construction of any claim term.

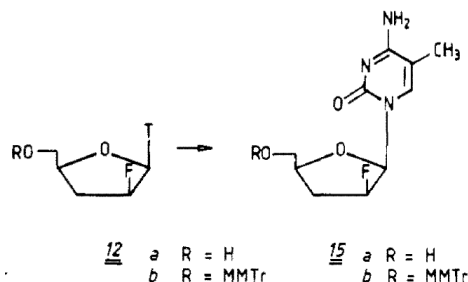
B. Level of Ordinary Skill in the Art

Petitioner contends that, as of the earliest possible priority date of the '569 patent, an ordinarily skilled artisan would have had a Ph.D. (or equivalent degree) in organic or medicinal chemistry, and two to three years of post-graduate work experience in medicinal chemistry, synthetic organic chemistry, and nucleic acid chemistry, including the development of oligonucleotide therapeutics, diagnostics, or building blocks. Pet. 12 (citing Ex. 1003 ¶¶ 18–21). Alternatively, Petitioner proposes that an individual holding a Bachelor's or Master's degree in organic chemistry or medicinal chemistry, who had at least three years of work experience in those fields, and who had gained a thorough understanding of the development of nucleic acid-based materials, would also have qualified as an ordinarily skilled artisan. *Id.*

For purposes of this Decision, we adopt Petitioner's definition of the level of ordinary skill because it is consistent with the prior art's demonstration of the level of ordinary skill at the relevant time. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (holding that “the prior art itself [may] reflect[] an appropriate level” as evidence of the ordinary level of skill in the art) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

C. Disclosures of Aerschot

Aerschot discloses the synthesis of a series of 2'- and 3'-fluorinated 2',3'-dideoxynucleosides and 3'-azido-2',3'-dideoxynucleosides. Ex. 1004, 1743. Specifically, it discloses compounds 12a and 15a as follows:



The figure above shows the chemical structures of compounds 12 and 15. *Id.* at 1744. Aerschot explains that compound 12a is 1-(2-Fluoro-2,3-dideoxy-(β -D-*threo*-pentofuranosyl)thymine and 15a is 1-(2-Fluoro-2,3-dideoxy-(β -D-*threo*-pentofuranosyl)-5-methylcytidine. *Id.* at 1745, 1747.

D. Alleged Anticipation of Claim 1

Petitioner asserts that Aerschot anticipates claim 1. Pet. 12–26. Based on this record, and for at least the following reasons, we determine Petitioner has established a reasonable likelihood that it would prevail in this assertion.

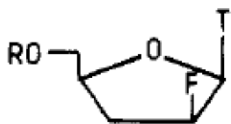
For a claim directed to a genus, if a prior art reference discloses a species falling within the claimed genus, the species anticipates the genus. *In re Slayter*, 276 F.2d 408, 411 (CCPA 1960); *see also Fresenius USA, Inc. v. Baxter Int'l, Inc.*, 582 F.3d 1288, 1298 (Fed. Cir. 2009) (stating that when a claim element is written in Markush form, “the entire element is disclosed by the prior art if one alternative in the Markush group is in the prior art”).

Claim 1 is directed to a genus of compounds having Formula Ia or Ib. It recites groups J, R⁴, R⁶, Bⁿ, each as a Markush group. Petitioner argues that “[o]ne compound that falls within the scope of Claim 1 is Formula Ia in which J is H (hydrogen), R⁴ is the -halo atom fluorine, R⁶ is —H (hydrogen),

and Bⁿ is thymine ('T')." Pet. 16 (citing Ex. 1003 ¶¶ 81–83, 85). This thymine compound, according to Petitioner, has four different potential stereoisomeric configurations. *Id.* at 17–18 (citing Ex. 1003 ¶¶ 86–87). One configuration, Isomer A, has both fluorine and thymine "up," as relative to the plane of the ring structure. *Id.*

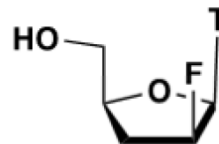
Petitioner asserts that Aerschot discloses Isomer A of claim 1 as compound 12a. *Id.* at 19 (citing Ex. 1003 ¶¶ 88–92). Petitioner provides the following comparison:

Aerschot compound 12a:



12 a R = H
 b R = MMTr

Isomer A Species of Claim 1



The figure above shows Petitioner's depiction of the side-by-side comparison of Aerschot compound 12a with Isomer A of claim 1. *Id.* (citing Ex. 1003 ¶¶ 87–88; Ex. 1004, 1744). Petitioner argues that these compounds are identical. *Id.* (citing Ex. 1003 ¶¶ 87–92; Ex. 1004, 1745, 1747). On this record, we agree with Petitioner's analysis and adopt it as our own.

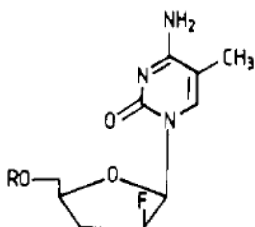
Petitioner asserts that "[a]nother species of claim 1 is the compound of Formula Ia wherein J is H, R⁴ is the -halo fluorine, R⁶ is —H, and Bⁿ is 5-methylcytosine." *Id.* at 22 (citing Ex. 1003 ¶ 106).

This 5-methylcytosine compound, according to Petitioner, also has four

different potential stereoisomeric configurations.² *Id.* at 22–23 (citing Ex. 1003 ¶ 107). One configuration, Isomer A1, has both fluorine and 5-methylcytosine “up,” as relative to the plane of the ring structure. *Id.*

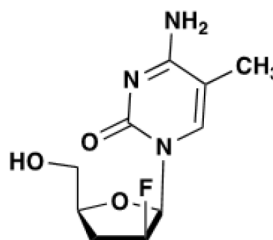
Petitioner asserts that Aerschot discloses Isomer A1 of claim 1 as compound 15a. *Id.* at 23 (citing Ex. 1003 ¶ 108; Ex. 1004, 1744). Petitioner provides the following comparison:

Aerschot Compound 15a



15 a R = H
 b R = MMTf

Isomer A1 of Claim 1



The figure above shows Petitioner’s depiction of the side-by-side comparison of Aerschot compound 15a with Isomer A1 of claim 1. *Id.* (citing Ex. 1003 ¶¶ 107–108). Petitioner argues that these compounds are chemically identical.³ *Id.* On this record, we agree with Petitioner’s analysis and adopt it as our own.

² Petitioner explains that the only difference between the 5-methylcytosine compound and the thymine compound is the Bⁿ group: in the former, it is 5-methylcytosine, whereas in the latter, it is thymine. (Ex. 1003 ¶ 106 n.3.)

³ Aerschot identifies compound 15a as 1-(2-Fluoro-2,3-dideoxy-(β-D-threo-pentofuranosyl)-5-methylcytidine. Ex. 1004, 1747. Citing Dr. Baran’s testimony, Petitioner argues that “5-methylcytidine (as used in Aerschot) and 5-methylcytosine (as used in claim 1 in the list of possible nucleobases that could satisfy the Bⁿ limitation) are merely two different names for the same nucleobase.” Pet. 24 (citing Ex. 1003 ¶ 111).

In sum, based on this record, we determine Petitioner has established a reasonable likelihood that it would prevail in its assertion that Aerschot, because of its disclosures of compounds 12a and 15a, anticipates claim 1. Therefore, we institute *inter partes* review.

E. Alleged Anticipation of Claim 2

Petitioner asserts that Aerschot anticipates claim 2. Pet. 26–30. Based on this record, and for at least the following reasons, we determine Petitioner has established a reasonable likelihood that it would prevail in this assertion too.

Relevant to this case, claim 2, like claim 1, is directed to a compound of Formula Ia or Ib, and recites J is H, R⁴ is the -halo fluorine, R⁶ is—H, and “B” is hydrogen or an optionally substituted nucleobase optionally functionalized at each exocyclic amine with an amine protecting group.” Ex. 1001, 114:35–117:52. Claim 2 specifies that the claimed compound “is not represented by” certain recited structural formulas.

Petitioner contends that the genus of claim 2 encompasses the same thymine compound and the same 5-methylcytosine compound as discussed in claim 1. Pet. 29 (citing Ex. 1003 ¶¶ 126–131). According to Petitioner, neither compound is excluded from the scope of claim 2 by the proviso at the end of claim 2. *Id.* at 29 n.3 (citing Ex. 1003 ¶ 130). Petitioner asserts that, “[f]or the reasons discussed above for Claim 1, Aerschot discloses, enables, and anticipates each of those two species of Claim 2.” *Id.* at 29 (citing Ex. 1003 ¶ 132). On this record, we agree with Petitioner’s analysis and adopt it as our own.

In sum, based on this record, we determine Petitioner has established a reasonable likelihood that it would prevail in its assertion that Aerschot, because of its disclosures of compounds 12a and 15a, anticipates claim 2.

III. CONCLUSION

Based on the current record, and for the reasons explained above, we find Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one claim challenged in the Petition. We therefore institute an *inter partes* review of all challenged claims on all asserted grounds.

At this stage of the proceeding, the Board has not made a final determination as to the construction of any claim term or the patentability of any challenged claim. We encourage the parties to further address all relevant issues of all challenges to fully develop the record during trial. Our view with regard to any finding or conclusion reached in the foregoing could change upon further development of the record during trial.

Any argument not raised in a timely Patent Owner Response to the Petition, or as permitted in another manner during trial, shall be deemed waived. In addition, nothing in this Decision authorizes Petitioner to supplement information advanced in the Petition in a manner not permitted by the Board's Rules.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review is hereby instituted on all challenged claims of the '569 patent based on all the asserted grounds set forth in the Petition; and

FURTHER ORDERED, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), notice is hereby given of the institution of a trial commencing on the entry date of this decision.

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