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Paper 9
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTERVET INC. a/k/a MERCK ANIMAL HEALTH,

Petitioner,

v.

BOEHRINGER INGELHEIM VETMEDICA, INC.,

Patent Owner.

Case IPR2018-01788
Patent 9,011,872 B2

Before TONI R. SCHEINER, GRACE KARAFFA OBERMANN, and ZHENYU YANG, *Administrative Patent Judges*.

OBERMANN, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

I. INTRODUCTION

Petitioner filed a Petition (Paper 1, "Pet.") requesting institution of an *inter partes* review of claims 1–24 (all claims) of U.S. Patent No. 9,011,872 B2 (Ex. 1001, "the '872 patent"). Patent Owner filed a Preliminary Response. Paper 6 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may be instituted only upon a showing that "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." Petitioner does not meet that threshold showing for review. Accordingly, we deny the Petition and decline to institute trial.

A. Related Proceedings

The parties identify as related: (1) a district court action involving the '872 patent; and (2) a petition for *inter partes* review filed against the '872 patent by Petitioner on the same day as the instant Petition. Pet. 2–3 (citing *Boehringer Ingelheim Vetmedica, Inc. v. Merck & Co., Inc. and Intervet Inc. a/k/a Merck Animal Health*, Case No. 2:18-cv-09534-JMV-JBC (D.N.J.) (Ex.1002); Case IPR2018-01789, Paper 1 ("IPR1789"); Paper 4, 2–3 (citing those same two matters as related to this proceeding). Concurrently herewith, we enter a decision in IPR1789. The parties identify as related other matters that do not directly involve the '872 patent. Pet. 2–4; Paper 4.

B. Background of the Field of Invention

Porcine circovirus 2 ("PCV2") was known, before the time of the invention, as a causative agent for a common viral condition in piglets known as post-weaning multi-systemic wasting syndrome ("PMWS"). Pet. 12 (citing Ex. 1003 ¶¶ 61–70); Prelim. Resp. 2–3 (citing Ex. 2001, 1). "Clinical symptoms of PMWS include progressive weight loss, lung lesions,

fever, anemia, jaundice, nasal shedding, diarrhea, coughing, dyspnea, and tachypnea." Pet. 12 (citing Ex. 1003 ¶¶ 66-70). The PCV2 genome includes two major open reading frames ("ORFs"), which are segments of DNA that can be translated into a protein. Pet. 13 (citing Ex. 1003 ¶¶ 72–73). The ORF2 segment codes for the "capsid" protein shell that encases the small, circular, single-stranded PCV2 genome. *Id*. (citing Ex. 1003 ¶¶ 71, 74); Ex. 1001, 1:65–2:7. The PCV2 ORF2 protein is recognized as useful "as an antigenic component in vaccines for PCV2." Ex. 1001, 2:22–25.

C. The '872 Patent (Ex. 1001)

The '872 patent describes an "improved method of producing" or "recovering" recombinant PCV2 ORF2 protein. Ex. 1001, Abstract, 2:65, 4:21, 4:64; 9:14. Production of recombinant PCV ORF2 protein (sometimes called rORF2) generally "involves the steps of transfecting recombinant virus containing open reading frame 2 coding sequences into cells contained in growth media, causing the virus to express open reading frame 2, and recovering the expressed protein in the supernate." Ex. 1001, Abstract; *see id*. at 1:25–43, 2:61–7:3. The specification describes exemplary experimental conditions and recovery techniques that provide asserted improvements as compared to prior art methods, as well as data showing the efficacy and scalability of vaccines produced according to the method of the invention. Ex. 1001, 25:21–74:30. Those examples include:

(1) experimental conditions for preparing, isolating, and recovering recombinant PCV2 ORF2 according to the method of the invention, including data demonstrating that, by extending the incubation time to allow ORF2 expression to proceed for at least 5 days and recovering ORF 2 from the supernatant of centrifuged cells and media, the inventive method

"provides a great increase in ORF2 yields, and a significant improvement over prior methods" (Example 1) (*id*. 27:33–41, Table 1; *see* 25:21–27:41);

(2) efficacy data based on the quantity of recombinant PCV2 ORF2 protein in samples produced by the inventive method for recombinant PCV2 ORF2, including information that neutralization with binary ethylenimine permits a recovery that "does not remove or degrade significant amounts of the recombinant PCV2 ORF2 protein product" (Example 2) (*id*. at 28:13–18, Table 2, 27:45–28:17);

(3) data establishing that the inventive methods of the invention are scalable (Example 3) (*id*. at 28:21–43);

(4) tests demonstrating the efficacy of seven PCV2 ORF2 candidate vaccines prepared according to the method of the invention, including data obtained from 108 piglets divided into nine groups, and data demonstrating that one 12-piglet group (Group 5) displayed "the highest level of protection" against symptoms of PCV2 infection (Example 4) (*id*. at 41:12–15 (for quoted disclosure); *see id*. at 28:48–42:28 (for entirety of Example 4)) where Group 5 piglets were administered a single 1 ml dose of the inventive recombinant PCV2 ORF2 formulation, containing 8 µg rORF2/ml of formulation prepared by mixing 1.11 ml of rORF2 with 6.4 ml of 0.5% Carbopol and 24.49 ml of phosphate buffered saline at a pH of 7.4 (which produced 32 ml of formulation for the Group 5 piglets) (*id*. at 30:44–51) that was administered with no "booster treatment" to Group 5 piglets challenged with virulent PCV2 virus (*id*. at 29::39–49, 32:15–35); and

(5) additional efficacy data pertaining to 150 piglets and eight PCV2 ORF2 candidate vaccines, including DNA sequencing corresponding to the

"SEQ ID NO" polypeptides of the immunogenic composition required by independent claim 21 (Example 5) (*id*. at 42:33–74:30, claim 21).

The specification states that immunogenic compositions containing recombinant PCV2 ORF2 protein prepared and recovered according to the method of the claimed invention "confer protective immunity against PCV2 infection and the clinical signs associated therewith." Ex. 1001, 16:64–17:3. The independent claims, and by inheritance the dependent claims, require an "immunogenic composition" of "recombinant PVC2 ORF2 protein" that imparts "a protective effect against clinical symptoms associated with a PCV2 infection after administration of a single dose thereof." *Id*. at claims 1, 15, 20, and 21.

D. Illustrative Claim

Claims 1, 15, 20, and 21 are the only independent claims. Claim 1 is illustrative of the subject matter and reproduced below:

> 1. An immunogenic composition comprising ***an effective amount of recombinant PCV2 ORF2 protein***, and an additional component selected from the group consisting of viral inactivators, inactivated viral vector, viral inactivator neutralizers, and combinations thereof, wherein said immunogenic composition provides ***a protective effect against clinical symptoms associated with a PCV2 infection after administration of a single dose thereof***.

Ex. 1001, 73:32–39 (emphasis added).

Independent claim 15 is directed to "[a] method of providing a ***protective effect*** against clinical symptoms of PCV2 infection in a pig after administration of ***a single dose*** of an immunogenic composition" according to steps set forth in the claim pertaining to the selection of "an ***effective amount of recombinant PCV2 ORF2 protein***" chosen from a group of specified polypeptides. *Id*. at 74:51–67 (emphasis added).

Independent claim 20 is similar to claim 1, but where claim 1 specifies "an effective amount of recombinant PCV2 ORF2 protein," claim 20 specifically requires "at least 2 μg of recombinant PCV2 ORF2 protein" in an "immunogenic composition" where that amount is capable of providing "a ***protective effect*** against clinical symptoms associated with a PCV2 infection after administration of ***a single dose*** thereof." *Id*. at 75:11–18 (emphasis added). Independent claim 21 similarly requires "[a]n immunogenic composition" of "***an effective amount*** of recombinant PCV2 ORF2 protein" that is selected from a group of specified polypeptides and "provides a ***protective effect*** against clinical symptoms associated with a PCV2 infection after administration of a ***single dose*** thereof." *Id*. at 75:19–76:11 (emphasis added).

We highlight the above terms to emphasize that every challenged claim requires an immunogenic composition containing an amount of recombinant PCV2 ORF2 protein that is effective, when delivered in a single dose, to protect against the clinical symptoms of PCV2 infection. That aspect of the claimed invention is critical to a dispositive issue of claim construction resolved in Section II.C of our analysis below. To the extent that any other claim term requires discussion, we provide it in our analysis of the asserted grounds of unpatentability.

E. Asserted Grounds of Unpatentability

The Petition identifies six references[1] in the grounds of unpatentability stated in the Petition:

[1] The Petition further advances the "knowledge of a [person of ordinary skill in the art]" in each ground based on obviousness. Pet. 6.

(1) Blanchard et al., *Protection of swine against postweaning multisystemic wasting syndrome (PMWS) by porcine circovirus type 2 (PCV-2) proteins*, VACCINE 21:4565-4575 (2003) (Ex. 1006) ("Blanchard");

(2) Jestin et al., U.S. Patent No. 6,703,023 (Ex. 1005) ("Jestin").

(3) Meng et al., International Publication No. WO 2003/049703 (Ex. 1007) ("Meng");

(4) M. Fenaux et al., *A Chimeric Porcine Circovirus (PCV) with the Immunogenic Capsid Gene of the Pathogenic PCV Type 2 (PCV2) Cloned into the Genomic Backbone of the Nonpathogenic PCV1 Induces Protective Immunity Against PCV2 Infection in Pigs*, 78 J.VIROL. 6297 (2004) (Ex. 1008) ("Fenaux");

(5) Bublot et al., U.S. Patent No. 6,497,883 (Ex. 1012) ("Bublot"); and

(6) Patrick Halbur et al, *Update on Porcine Circovirus Type 2 (PCV2)-Associated Diseases*, VET. DIAGN. PRODUCTION ANIMAL MED. (Ex. 1011) ("Halbur").

Pet. 6. Those six references are asserted as follows:

Reference(s)	Statutory Ground(s)	Claim(s)
Blanchard	§ 102(b)	1–5, 11–16, 18–24
Jestin	§ 102(b)	1–5, 11–13, 15, 16, 18–24
Blanchard, Jestin, Meng, and/or Fenaux	§ 103(a)	1–5, 11–16, 18–24
Blanchard and/or Jestin, and Bublot	§ 103(a)	6–10
Blanchard and/or Jestin and Halbur	§ 103(a)	17

Pet. 6. The Petition is supported also by the Declaration of Darin Madson, D.V.M., Ph.D. (Ex. 1003).

II. ANALYSIS

A. Improper Incorporation by Reference

The Board may "decline to consider information that is not identified sufficiently in the Petition, but instead is incorporated by reference to cited portions of" a supporting declaration. *Instrumentation Lab. Co. v. Hemosonics LLC*, Case IPR2017-00855, slip. op. at 14 (PTAB September 1, 2017) (Paper 14) (citing 37 C.F.R. § 42.6(a)(3)) (other citation omitted). Incorporation "by reference amounts to a self-help increase in the length of the [] brief[,]" and "is a pointless imposition on the court's time. A brief must make all the arguments accessible to the judges, rather than ask them to play archeologist with the record." *DeSilva v. DiLeonardi*, 181 F.3d 865, 866–67 (7th Cir. 1999); *see Cisco Sys., Inc. v. C-Cation Techs., LLC*, Case IPR2014-00454, slip op. at 7–10 (PTAB August 29, 2014) (Paper 12) (informative) (discussing incorporation by reference).

The Petition essentially forgoes citation to the asserted prior art references, by repeatedly relying instead on the Madson Declaration to support Petitioner's characterizations of the prior art. *See* Pet. 25–75 (repeatedly citing to Exhibit 1003 alone, without citation to the prior art, when discussing the prior art). The Board's rules do not permit, and we are under no obligation to accept, argument that characterizes a prior art disclosure, where that argument is unsupported by a citation to the prior art, and directs us instead solely to declaration testimony. 37 C.F.R. § 42.22(a)(2) (petition must contain a "full statement of the reasons for the relief requested, including a detailed explanation of the significance of the

evidence"); 37 C.F.R. § 42.6(a)(3) (prohibiting argument made in a supporting document from being incorporated by reference into a petition). Here, we discern a violation of those rules that pervades every ground of unpatentability raised in the Petition, and warrants denial of review on that basis alone. Pet. 25–75.

In the alternative, as explained below, Petitioner does not establish a reasonable likelihood of prevailing with respect to at least one challenged claim based on the grounds of unpatentability stated in the Petition.

B. The Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art at the time of the invention would have had a doctorate of veterinary medicine (or an equivalent education or practical experience), or a Ph.D. (or an equivalent education or practical experience) in immunology, vaccinology, virology, animal science, husbandry, or a closely related field. Pet. 7. In Petitioner's view, moreover, an ordinarily skilled artisan also would have had a general understanding of vaccine science, including veterinary vaccines, based on training, experience, or thorough research and collaboration with other individuals, for example, as members of a research team or group. *Id*.

For purposes of this decision, we find that the prior art itself is sufficient to demonstrate the level of ordinary skill in the art at the time of the invention. *See Okajima v. Bourdeau,* 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art itself can reflect the appropriate level of ordinary skill in the art). To the extent that a more specific definition is required, we adopt Petitioner's definition, because Patent Owner raises no genuine dispute about it for purposes of this decision and, further, it is consistent with disclosures of the asserted prior art. Pet. 7; *see generally* Prelim. Resp.

C. Claim Construction

We interpret claims in an unexpired patent using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b) (2018).[2] Under that standard, claim terms are given their ordinary and customary meaning in view of the specification, as understood by a person of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). We resolve disputed claim terms only to the extent necessary to our decision. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

Only one claim term requires express construction for purposes of this decision; namely, the term that specifies an "immunogenic composition" containing recombinant PCV2 ORF2 protein in an "amount" that is "effective" to impart "a protective effect against clinical symptoms associated with a PCV2 infection after administration of a single dose thereof." Ex. 1001, claims 1, 15, 20, and 21 (independent claims, each reciting that claim term). We refer to that claim term as "the protective effect limitation."

[2] A recent amendment to this rule does not apply here, because the Petition was filed before November 13, 2018. *See* "Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board," 83 Fed. Reg. 51,340 (Oct. 11, 2018 (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

The Protective Effect Limitation

Petitioner argues that the protective effect limitation broadly "encompasses a protective effect of any magnitude, duration, or type, against any clinical symptom associated with a PCV2 infection or against PCV2 infection itself." Pet. 21. By way of support, however, Petitioner supplies not a single citation to record evidence, relying instead on bare attorney argument that "[t]here is no minimum level of protection specified in the specification or claims," that "the claim is not limited to protection against a particular symptom or set of symptoms," and "any degree of protective effect against any clinical symptoms is sufficient." *Id*. Petitioner cannot satisfy its burden of proving unpatentability by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Standing alone, Petitioner's failure to point out and identify "with particularity" evidence that supports its view on this critical aspect of the challenge justifies denial of review. 35 U.S.C. § 312(a)(3).

Patent Owner, by contrast, directs us to persuasive evidence that Petitioner's view of the protective effect limitation is overly broad and sweeps in any immunological response that generates a detectable level of antibody production following administration of a dose of a vaccine that includes recombinant PCV2 ORF2 protein. *See* Prelim. Resp. 12–18 (citations therein); Pet. 30–32 (discussing Blanchard). For the following reasons, we find that the plain language of the claims, the disclosure of the specification, and the prosecution history consistently support Patent Owner's narrower interpretation of the protective effect limitation. *Id*.

The language of the protective effect limitation, on its face, requires an "immunogenic composition" containing recombinant PCV2 ORF 2

protein in an "amount" that is "effective" to impart "a ***protective effect*** against clinical symptoms associated with a PCV2 infection after administration of a ***single dose*** thereof." Ex. 1001, claims 1, 15, 20, and 21 (emphasis added). The "comprising" claims are open to additional components that may, for example, boost the properties of the recombinant PCV2 ORF2 protein in the composition. *Id*. But the claim language itself expressly ties the required "protective effect" to the "recombinant PCV2 ORF2 protein" component of the "immunogenic composition"—an effect that must result from administration of "a single dose" of the composition. Ex. 1001, 16:64–17:3, claims 1, 15, 20, and 21.[3]

Petitioner's position that the protective effect limitation more broadly encompasses "any degree of protective effect against any clinical symptoms" of disease (Pet. 21) conflicts with the specification, which explains, "the host will display either a therapeutic or protective immunological response such that resistance to new infection will be enhanced and/or the clinical severity of the disease is reduced." Prelim. Resp. 14 (quoting Ex. 1001, 5:17–31). We agree with Patent Owner that the quoted disclosure "draws a distinction between merely eliciting an immunological response and conferring a protective effect against clinical symptoms." *Id*. at 15; *see* Ex. 1001, 16:38–41; 16:64–17:3. Petitioner

[3] The specification defines the phrase "immunogenic composition" to mean "a PCV2 ORF2 protein." Ex. 1001, 16:64–17:3. That definition confirms that PCV2 ORF2 protein itself (not a whole virus that encodes for that protein) provides the required "protective effect against the clinical symptoms associated with PCV2 infection after administration of a single dose thereof." *Id*. at claims 1, 15, 20, and 21 (independent claims). The specification drives home that point by drawing a distinction between "PCV2 ORF2 protein" and "whole PCV2 virus." Ex. 1001, 22:47–52.

admits as much, stating, "[i]t was known that in order to protect against clinical symptoms associated with PCV2 infection, ***a sufficient level*** of neutralizing antibodies must be generated." Prelim. Resp. 15 (quoting Pet. 32 (citing Ex. 1003 ¶ 198)).

In Petitioner's view, the protective effect limitation is broad enough to embrace any immunological response (that is, any detectable level of antibody production) that accompanies the administration of recombinant PCV2 ORF2 protein delivered as one of multiple doses in a "'prime-boost" regimen—as long as the multiple doses protect against the symptoms of PCV infection. Pet. 30–32 (argument that "Blanchard's first dose" of "ORF2 subunit vaccine must have produced neutralizing antibodies" and that "the subunit vaccine ultimately completely prevented clinical symptoms associated with PMWS" after multiple doses of vaccine). That view is at odds with the "single dose" language of the claims and, further, with the Examiner's construction of the protective effect limitation during prosecution. Ex. 1001, claims 1, 15, 20, and 21; *see* Prelim. Resp. 4 (citing Ex. 1006, 4566–4567), 9–10 (including citations to the prosecution history).

Specifically, as Patent Owner observes, during patent prosecution, the applicants overcame rejections based on the disclosure of Ellis,[4] a reference directed to a prime-boost regimen for administering multiple doses of PCV2 ORF2 protein to piglets, which "reduced or lessened the incidence of clinical symptoms associated with PCV2." Prelim. Resp. 9 (citing Ex. 1004, 1886–1901, 2002; Ex. 1046, 3:26–33 (Ellis)). The applicants submitted evidence to establish "that a single dose" of the claimed immunogenic composition

[4] Ellis et al., U.S. Patent No. 6,517,843 (Ex. 1046) ("Ellis").

"provided a protective effect [that] was surprising and unexpected" as compared to Ellis's prime-boost regimen. Prelim. Resp. 8 (citing Ex. 2006, ¶¶ 19–33, 44–45, 58). Following submission of that evidence, the Examiner allowed the claims to issue, but only after the applicants added, by amendment, the claim language that requires "a protective effect against" clinical symptoms associated with a PCV2 infection after "administration of a single dose" of the claimed immunogenic composition. Ex. 1001, claims 1, 15, 20, 21; Prelim. Resp. 10 (citing Ex. 1004, 2032, 2041–2050, 3076–3082; Ex. 2005, 235–243; Ex. 2006, 237–251).

On this record, we find that the protective effect limitation requires an immunogenic composition containing recombinant PCV2 ORF2 protein that is present in an amount effective to provide a protective effect against the clinical symptoms of PCV2 infection when administered in a single dose. That point was the focus of an interview with the Examiner, during which the applicants "explained the significance of [the] 'one-dose' limitation" as well as "the unexpected results the one dose provided as oppose[d] to the prior art teaching." Prelim. Resp. 8 (citing Ex. 2006, 337).

Conclusion

Based on the claim language, specification, and prosecution history, we find that Petitioner advances an incorrect construction of the protective effect limitation. That fact, standing alone, warrants denial of the Petition. Before trial is instituted, during the preliminary stage of a proceeding, the Board's function is to assess whether the information presented in a petition and any preliminary response filed "shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the" challenged patent claims. 35 U.S.C. § 314(a). As a culmination of that

assessment, the Board may, and routinely does, decline to institute trial where the challenge asserted in a petition is keyed to an incorrect claim construction. *See, e.g.*, *Schlumberger Tech. Corp. v. EnerPol, LLC*, Case IPR2018-00077 (PTAB Apr. 25, 2018) (Paper 16, 6–17); *United Patents, Inc. v. Uniloc Luxembourg S.A.*, Case IPR2018-00057 (PTAB May 11, 2018) (Paper 9, 3–8); *Duo Security Inc. v. Strikeforce Tech., Inc*., Case IPR2017-01064 (PTAB Oct. 16, 2017) (Paper 7, 6–11); *Google Inc. v. InfoGation Corp*., Case IPR2017-00819 (PTAB Sept. 11, 2017) (Paper 16, 7–14, 17–19, 21–22); *Eiko Global, LLC v. Blackbird Tech LLC*, Case IPR2017-00980 (PTAB Sept. 1, 2017) (Paper 16, 5–36).

D. The Asserted Grounds of Unpatentability

Alternatively, for reasons that follow, we find that the information presented does not demonstrate a reasonable likelihood that Petitioner would prevail at trial with respect to any challenged claim.[5] We address each ground of unpatentability in turn below.

Anticipation by Blanchard

Petitioner asserts that Blanchard, which refers to "Orf-2 encoded capsid protein, used in a preparation-based DNA and subunit vaccine," anticipates the "immunogenic composition" of the challenged claims because "Blanchard discloses that piglets developed antibodies to PCV2 ORF2 after a single dose of the vaccine." Pet. 26–27 (emphasis omitted).

[5] We decline to reach the question whether a discretionary denial is warranted under 35 U.S.C. § 325(d) because the Petition raises the same or substantially the same arguments or prior art that was previously considered by the Examiner during patent prosecution. *Compare* Pet. 16–19, *with* Prelim. Resp. 18–35.

We agree with Patent Owner that Petitioner relies on data reported in Blanchard's Figure 3 as evidence that a single dose of Blanchard's ORF2 protein is capable of achieving seroconversion, meaning that administration of Blanchard's vaccine produced at least some antibodies. Prelim. Resp. 40 (citing Pet. 30–33). In other words, Petitioner's analysis is keyed to an incorrect assumption that "the 'protective effect' element of independent claims 1, 15, 20, and 21 encompasses a protective effect of any magnitude, duration, or type" and reflects "no minimum level of protection." Pet. 21.

Alternatively, Petitioner does not show sufficiently that Blanchard discloses an immunogenic composition of recombinant PCV2 ORF2 protein capable of providing the specified protective effect in a single dose, as required by the challenged claims. On that point, Petitioner directs us to information that Blanchard discloses a prime-boost regimen that involves the administration of multiple doses of DNA vaccine, followed two weeks later by "the same DNA vaccines" in combination with "subunit vaccines containing a recombinant ORF1 and ORF2 protein." Pet. 25. Against that backdrop, Petitioner argues that "a single dose of the recombinant ORF2 protein was administered as part of this second injection." *Id*.

The very fact that Blanchard employs multiple doses of vaccine cuts against Petitioner's argument that Blanchard anticipates the claimed immunogenic composition, which requires that the claimed protective effect be provided by an effective amount of recombinant PCV2 ORF2 protein administered in a single dose. Petitioner unpersuasively attempts to tease out a protective effect attributable to recombinant PCV2 ORF2 protein in Blanchard's prime-boost regimen, which includes multiple doses of "DNA

vaccines" in combination with "subunit vaccines containing a recombinant . . . ORF2 protein." Pet. 25; *see id*. at 27–28, 30–33, 35–36.

Specifically, Petitioner submits that the '872 patent itself indicates "that a concentration of ORF2 protein as low as 0.2 μg per dose is 'effective for inducing the desired immune response, namely reducing the incidence of or lessening the severity of clinical signs resulting from PCV2 infection.'" Pet. 29 (emphasis added). Petitioner further submits, "Blanchard's ORF2 subunit vaccine comprised between 106 and 169 μg of recombinant PCV2 ORF2 protein per dose." *Id*. (citing Ex. 1003 ¶¶ 188–189, referring to arguments that appear elsewhere in the Petition (*see id*.)). On that basis, Petitioner reasons that the amount of recombinant PCV2 ORF2 protein contained in Blanchard's composition inherently achieves, in a single dose, the protective effect required by the claims. *Id*. at 29–30.

Petitioner does not show sufficiently, however, that Blanchard discloses a vaccine that comprises "between 106 and 169 μg of recombinant PCV2 ORF2 protein per dose." Pet. 29. The Petition devotes two sentences to that factual contention, which is not adequately developed or supported. *Id*. at 35–36 (citing Ex. 1003 ¶¶ 218–221; Ex. 1010 ¶¶ 2, 8). Petitioner relies on Dr. Madson's testimony, concerning the "Declaration of Merrill L. Schaeffer, Ph.D." (Ex. 1010), a scientist affiliated with Patent Owner. Pet. 35–36 (citing Ex. 1003 ¶¶ 219–220). Petitioner and Dr. Madson aver that two of Dr. Schaeffer's statements represent party admissions sufficient to bind Patent Owner in this proceeding, but provide an inadequate analysis of Dr. Schaeffer's underlying conclusions and no discussion or explanation of Dr. Schaeffer's test data. Ex. 1003 ¶¶ 219–220 (citing Ex. 1010).

We are not persuaded that Petitioner's showing meets the exacting standards required of a party asserting an inherent disclosure in the prior art. *See* Prelim. Resp. 33–34 (discussing that evidence). As Patent Owner persuasively points out, "it is not simply a matter of providing more protein in a dose in order to provide an efficacious one-shot vaccine." Pet. 39 (quoting Ex. 1065 ¶ 15) (emphasis omitted). Petitioner does not address whether or how other components in the immunogenic composition may affect the ability of the recombinant PCV2 ORF2 protein to achieve the required protective effect. Pet. 29. Nor does Petitioner address whether or why a single dose of vaccine prepared according to the improved method of the invention achieves a protective effect comparable to a single dose of vaccine prepared according to Blanchard's different method. *See, e.g*., Ex. 1001, 30:44–51; 41:12–15 (describing the components of the vaccine administered in a single dose to Group 5 piglets, which produced "the highest level of protection" against symptoms of PCV2 infection).

To the extent that Petitioner focuses on the disclosure of Blanchard itself, Petitioner's analysis is tethered to an incorrect claim construction. Pet. 30–33. Petitioner contends that results obtained by Blanchard "indicate that the first dose of Blanchard's ORF2 protein subunit vaccine induced the production of neutralizing antibodies"—but that contention is based on an unsupported assumption that any immunogenic response meets the required protective effect. *Id*. at 32. Even if we accept that Blanchard achieved "antibody production after a single dose," at best, "the subunit vaccine ultimately completely prevented clinical symptoms associated with PMWS" only after piglets received multiple doses of vaccine pursuant to Blanchard's "prime-boost" protocol. *Id*. (citing Ex. 1003 ¶ 199); *see* Ex. 1006, 4566

(Section 2.4, describing vaccination protocol), 4570 (Table 4); Prelim. Resp. 40–44 (identifying flaws in Petitioner's arguments, including that Blanchard expressly states, "we can predict a good efficacy of our subunit vaccine in a prime-boost approach") (emphasis omitted).

For all of the above reasons, we agree with Patent Owner that Petitioner does not show sufficiently that Blanchard's subunit vaccine inherently provides the required protective effect in a single dose. *Compare* Pet. 29–30, *with* Prelim. Resp. 38–40; *see* Ex. 1003 ¶ 190 (Dr. Madson's assertion that the protective effect limitation is "an inherent property of the ORF2 vaccine compositions taught in Blanchard"). "To establish that a prior art reference inherently—rather than expressly—discloses a claim limitation, 'the limitation at issue necessarily must be present, or [is] the natural result of the combination of elements explicitly disclosed by the prior art.'" *Endo Pharm. Sols., Inc. v. Custopharm Inc.*, 894 F.3d 1374, 1381 (Fed. Cir. 2018) (alteration in original) (quoting *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1196 (Fed. Cir. 2014)).

> Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient. [Citations omitted.] If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught would result in the performance of the questioned function, it seems to be well settled that the disclosure should be regarded as sufficient.

Cont'l Can Co. USA v. Monsanto Co., 948 F.2d 1264, 1269 (Fed. Cir. 1991) (alteration in original) (quoting *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981)). In an *inter partes* review, the burden of proof is on the petitioner to prove unpatentability by a preponderance of the evidence, and that burden never shifts to the patent owner. *Dynamic Drinkware, LLC v. National*

Graphics, Inc., 800 F.3d 1375, 1378 (Fed. Cir. 2015). Thus, in order to prevail, Petitioner must direct us to persuasive evidence that Blanchard discloses an immunogenic composition that includes an amount of recombinant PCV2 ORF2 protein that provides the required protective effect—in a single dose.

Petitioner cannot, as an examiner can, shift the burden of persuasion to Patent Owner to establish the patentability of the challenged claims based on a presumption that Blanchard discloses an immunogenic composition of recombinant PCV2 ORF 2 protein that necessarily meets the protective effect limitation. On this record, we find that Petitioner does not show adequately that Blanchard's asserted immunogenic composition of recombinant PCV2 ORF2 necessarily provides the specified protective effect in a single dose. *See* Pet. 29–30; Ex. 1003 ¶ 190).

Conclusion

Petitioner fails to show sufficiently that Blanchard discloses an immunological composition that satisfies the protective effect limitation of the challenged claims, which require an immunogenic composition that contains an "amount" of "recombinant PCV2 ORF2 protein" that is "effective" to provide "a protective effect against the clinical symptoms of PCV2 infection" when administered in "a single dose." Ex. 1001, 1, 15, 20, and 21. Accordingly, based on the information presented, we find that Petitioner does not demonstrate a reasonable likelihood of prevailing with respect to any challenged claim based on anticipation by Blanchard.

Anticipation by Jestin

The challenge based on anticipation by Jestin suffers from many of the same deficiencies identified above in connection with Blanchard. In an

attempt to make out this challenge, Petitioner directs us to Example 8 of Jestin, which, according to Petitioner, "discloses a single dose of an ORF2 protein subunit vaccine administered as the third injection of a prime-boost protocol." Pet. 45. Petitioner asserts (with no citation to record evidence) that "subsequent teachings (including the '872 patent itself) recognize that a single dose of a composition containing the amount of ORF2 protein taught in Jestin would inherently provide" the requisite protective effect. *Id*.

Our reasoning above as to Blanchard applies with equal force to Jestin. As Patent Owner points out, "Petitioner offers no evidence that Jestin's third injection alone would achieve the claimed protective effect if it were administered as a single dose." Prelim. Resp. 45. Nor does Petitioner show sufficiently that Jestin discloses an immunogenic composition that inherently meets the protective effect limitation of the challenged claims. Pet. 45; *compare* Ex. 1005, 47:8–22 (Jestin's Example 8), *with* Ex. 1001, (Example 1) (conditions for preparation, isolation, and recovery of recombinant PCV2 ORF2 protein according to the inventive method).

Conclusion

Petitioner fails to show sufficiently that Jestin discloses an "immunogenic composition" that satisfies the protective effect limitation of the challenged claims—by incorporating an amount of recombinant PCV2 ORF2 protein sufficient to provide a protective effect against the symptoms of PCV2 infection in a single dose. Accordingly, based on the information presented, Petitioner does not demonstrate a reasonable likelihood of prevailing at trial with respect to any challenged claim on the ground based on anticipation by Jestin.

Grounds Based on Obviousness

The obviousness grounds stated in the Petition similarly do not meet the threshold for trial institution. The sole obviousness ground asserted against the independent claims depends on assertions that Meng and Fenaux—both of which disclose whole virus vaccines that may be administered in a single dose—would have prompted an ordinarily skilled artisan to administer Blanchard's (or Jestin's) immunogenic composition of recombinant PCV2 ORF2 protein "as a single-dose vaccine." Pet. 61–62. For reasons set forth above, Petitioner does not show sufficiently that Blanchard or Jestin discloses an immunogenic composition that necessarily provides the requisite protective when administered in a single dose.

The remaining obviousness grounds are directed to dependent claims, and do not improve any challenge asserted against independent claims 1, 15, 20, or 20. Pet. 69–75. The challenge based on Bublot is asserted against dependent claims 6–10. *Id*. at 69–73. The ground based on Halbur is directed only against additional limitations of dependent claim 17. *Id*. at 73–75. Where Petitioner fails to make out the threshold showing for institution of review with respect to any independent claim, Petitioner fails also to make out the requisite showing with respect to any dependent claim.

Conclusion

Petitioner fails to demonstrate a reasonable likelihood of prevailing at trial by showing that the subject matter of any challenged claim would have been obvious at the time of the invention.

III. CONCLUSION

Based on the information advanced in the Petition and the Preliminary Response, for reasons stated above, we find no "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). Accordingly, we *deny* the Petition and do not institute an *inter partes* review.

IV. ORDER

It is

ORDERED that under 35 U.S.C. § 314(a), the petition is *denied* and no *inter partes* review is instituted.

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