

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte SUZANNE ZEBEDEE, GENEVIEVE INCHAUSPE,
MARC S. NASOFF, and ALFRED M. PRINCE

Appeal 2008-4574
Application 10/677,956
Technology Center 1600

Decided: November 20, 2008

Before TONI R. SCHEINER, ERIC GRIMES, and
FRANCISCO C. PRATS, *Administrative Patent Judges*.

PRATS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a method for detecting antibodies to non-A, non-B hepatitis virus (NANBV) in body fluid samples. The Examiner has rejected the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Claims 141, 143, 144, 146, and 147 stand finally rejected and are on appeal (App. Br. 3).¹ The rejected claims have not been argued separately, and therefore stand or fall together. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Claim 141 is representative of the appealed claims and reads as follows:

Claim 141: A method for detecting seroconversion associated with NANBV infection at early times after infection comprising:

- (a) initiating an immunoreaction by contacting a body fluid sample with a NANBV capsid antigen and C-100-3 antigen;
- (b) maintaining said immunoreaction for a time period sufficient for allowing antibodies against the NANBV capsid and C-100-3 antigens present in said body fluid sample to immunoreact with said NANBV capsid and C-100-3 antigens to form immunoreaction products; and
- (c) detecting the presence of any of said immunoreaction products formed and thereby detecting early seroconversion.

The Examiner relies on the following document as evidence of unpatentability:

Houghton US 5,350,671 Sep. 27, 1994

The following rejection is before us for review:

Claims 141, 143, 144, 146, and 147 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Houghton (Ans. 3-5).

¹ Appeal Brief filed March 14, 2008.

OBVIOUSNESS

ISSUE

The Examiner cites Houghton as disclosing a method for detecting antibodies to hepatitis C virus (HCV),² the method including the steps of providing an HCV peptide having amino acid residues that are present in the viral capsid antigen, “contacting the peptide with a biological sample (including fluid samples), and detecting the resulting immunocomplex (the immunoreaction product)” (Ans. 4). The Examiner concedes that Houghton “does not specifically teach the combined use of the [capsid] antigen . . . in combination with the C-100-3 antigen. However, the reference does teach that the C100-3 polypeptide is also useful for the detection of anti-HCV antibodies in samples” (*id.*).

Because Houghton teaches that the C-100-3 antigen and the capsid antigen are “useful for the detection of anti-HCV antibodies,” the Examiner concludes that “it would have been obvious to those of ordinary skill in the art to combine these antigens for the detection of anti-HCV antibodies . . . because it is prima facie obvious to combine compositions known in the art to perform the same function” (*id.* (citing MPEP § 2144.06)).

Regarding the preamble recitation in claim 141 of detecting seroconversion associated with NANBV infection “at early times after infection,” the Examiner notes that capsid antigen has been shown by Appellants to detect seroconversion in early infection (*id.* at 5). The

² According to the Specification, “[m]ost cases of Non-A, Non-B hepatitis (NANBV) are caused by the transmissible virus now designated as hepatitis C virus (HCV).” (Spec. 4 (substitute Specification filed September 7, 2006).)

Examiner reasons that, because Houghton teaches using capsid antigen for detecting anti-HCV antibodies in serum, the preamble's "functional requirement would be inherently met by the practice of the invention described by the reference, i.e. it is a latent property of the methods for detecting anti-HCV antibodies described by Houghton" (*id.* (citing MPEP § 2145. II)).

Appellants contend that the Examiner's interpretation of Houghton is unjustifiably narrow, and "guided by improper hindsight" (App. Br. 10). Instead, Appellants argue, a full understanding of the teachings of Houghton would have led a person of ordinary skill away from combining capsid and C-100-3 antigens (*see id.*). Moreover, Appellants argue, "all of the 'secondary considerations' weigh in Appellant's favor" (*id.* at 6).

Thus, the threshold issue raised by this appeal is whether the Examiner has established a *prima facie* case that it would have been obvious for one skilled in the art to detect NANBV seroconversion using both a capsid antigen and the C-100-3 antigen. If so, the residual issue is whether the secondary considerations raised by Appellants are sufficient to overcome the *prima facie* case of obviousness.

FINDINGS OF FACT ("FF")

1. Houghton discloses "the isolation and characterization of a newly discovered etiologic agent of NANBH, hepatitis C virus (HCV), its nucleotide sequences, its protein sequences and resulting polynucleotides, polypeptides and antibodies derived therefrom" (Houghton, col. 5, ll. 28-32).
2. Houghton discloses that peptides obtained from the virus can be used in "[a]n immunoassay for detecting antibodies directed against an HCV antigen comprising incubating a sample suspected of containing anti-HCV

antibodies with a probe polypeptide which contains an epitope of the HCV, under conditions which allow the formation of an antibody-antigen complex; and detecting the antibody-antigen complex containing the probe antigen” (Houghton, col. 7, ll. 10-17).

3. Houghton discloses that “[i]n one embodiment, the immunoassay uses a combination of viral epitopes derived from HVC [sic]. These epitopes may be derived from the same or from different viral polypeptides, and may be in separate recombinant or natural polypeptides, or together in the same recombinant polypeptides” (Houghton, col. 36, ll. 37-42).

4. Claim 9 of Houghton recites:

9. An immunoassay for detecting antibodies that bind to an HCV polypeptide comprising:

(a) providing an antigen comprising a polypeptide selected from the group consisting of (i) a polypeptide consisting of a sequence of amino acid residues 1 to 84, amino acid residues 9 to 177, or amino acid residues 1 to 120 of FIG. 90 and (ii) immun[o]logically reactive fragments of polypeptide (i) of at least 8 contiguous amino acid residues;

(b) incubating said antigen with a biological sample under conditions that allow for formation of an antibody-antigen complex; and

(c) detecting any antibody-antigen complex comprised of said antigen.

(Houghton, col. 140, ll. 55-68.)

5. Houghton discloses, and Appellants do not dispute, that amino acid residues 1 to 120 of the HCV polyprotein correspond to the capsid domain of the viral polyprotein (Houghton, col. 81, l. 58).

6. Houghton discloses testing an HCV cDNA expression library with serum from infected patients (Houghton, cols. 82-83), and finding that “a number of clones expressed polypeptides containing HCV epitopes which

were immunologically reactive with serum from individuals with NANBH. Five of these polypeptides were very immunogenic in that antibodies to HCV epitopes in these polypeptides were detected in many different patient sera” (*id.* at col. 83, ll. 16-22; *see also* Figure 65).

7. Houghton discloses that two of the five clones that produced polypeptides that were very immunogenic to infected serum, CA279a and CA290a, produced polypeptides with amino acid sequences including capsid domains (Houghton, col. 83, ll. 23-42).

8. Houghton discloses that one of the five polypeptides described as being very immunogenic was from the C100 clone (Houghton, col. 83, ll. 23-42). The polypeptide produced by the C100 clone is termed “C100-3” (*id.* at col. 73, ll. 44-46).

9. Houghton discloses that a C-100-3-expressing clone “expressed a polypeptide of ~54,000 dalton molecular weight which did react immunologically with the human NANBH serum” (Houghton col. 76, ll. 1-4). Houghton also discloses that the C-100-3 polypeptide was capable of detecting antibodies in serum using solid phase radioimmunoassay (*id.* at col. 97, ll. 29-54).

10. Houghton discloses that “[t]he results on the immunogenicity of the polypeptides encoded in the various clones examined suggest efficient detection and immunization systems may include panels of HCV polypeptides/epitopes” (Houghton, col. 83, ll. 55-58; *see also* Figure 65).

11. Figure 65 of Houghton, reproduced below, “presents the antigenicity of polypeptides expressed from HCV cDNA clones used in an antigenic mapping study of the putative HCV polyprotein” (Houghton, col. 11, ll. 1-3):

	CHIMPS			CHRONIC HCV PATIENT C100 POSITIVE								CHRONIC HCV PATIENT C100 NEGATIVE								COMMUNITY AC				
	1. POST ACUTE	2. POST ACUTE	3. C100 CONVERSION	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1. C100(-)	2. C100(+)	3. C100(+)	4. C100(+)	5. C100(+)
SOD	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA259a	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-
CA290a	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-
CA202a	N.T.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA167a	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA156C	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
π14a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA84a	±	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA59a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA61C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA74a	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C26j	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C3i	±	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C2f	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C23g	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C9h	±	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C7i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C7e	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C8h	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C33c	+	±	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	±	+	-	±	-	-
C40g	±	-	-	-	-	-	-	-	-	-	±	-	-	-	-	-	-	-	-	-	-	-	-	-
C37b	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C35	±	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-11	+	-	±	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	+	+	±	+	+	-
C6i	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C33b	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C25c	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C4c	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	+	-	-	-	-
C8f	±	-	±	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
C33f	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	+	+	-	-	-	-
C33g	±	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C39c	±	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
C35f	N.T.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C9g	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C26g	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C5e	±	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	±	-	-	-	-	-

N.T. = EXPRESSION NOT TESTED
 ± THIS POLYPEPTIDE WAS NEGATIVE IN THIS COLONY SCREEN BUT POSITIVE BY WESTERN BLOT ANALYSIS

FIG. 65

Figure 65 shows the results of testing at least one of the two capsid polypeptides, CA290a,³ against the sera of several of subjects, including post-acute chimps (negative immunological reaction), at least one C100-positive chronic HCV patient (positive immunological reaction in samples 5 through 8), and at least one convalescent C100-negative patient (positive immunological reaction).

³ Figure 65 also shows testing clone “CA259a,” which appears to be a typographical error for clone CA279a, the other capsid polypeptide-producing clone reported as being tested by at Houghton at col. 83, ll. 29 and 39. The results for “CA259a” are identical to those of CA290a.

12. Appellants' Specification discloses that NANBV capsid antigens detect anti-NANBV antibodies in acute stages of NANBV infection (Spec. 104).⁴

PRINCIPLES OF LAW

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a *prima facie* case of obviousness based upon the prior art. “[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.”

In re Fritch, 972 F.2d 1260, 1265 (Fed. Cir. 1992) (citations omitted, bracketed material in original). Furthermore, “[e]ven when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference.” *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000).

While emphasizing a flexible approach to the obviousness question, the Supreme Court has nonetheless similarly noted that “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements *in the way the claimed new invention does* . . . because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (emphasis added); *see also id.* at 1740-41 (requiring a determination of “whether there

⁴ Substitute Specification (clean copy) filed September 7, 2006.

was an apparent reason to combine the known elements *in the fashion claimed by the patent at issue*”) (emphasis added).

Regarding process claims, a preamble recitation that merely expresses the purpose of performing the claimed steps is not a limitation on the process where the body of the claim fully sets forth the steps required to practice the claimed process, and where the preamble recitation does not affect how the claimed steps are to be performed. *See Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1375-76 (Fed. Cir. 2001).

Thus, in *Bristol-Myers*, the court held that preamble language stating that a treatment method was “for reducing hematologic toxicity” did not limit the claim since the steps would be “performed in the same way regardless whether or not the patient experiences a reduction in hematologic toxicity, and the language of the claim itself strongly suggests the independence of the preamble from the body of the claim.” *Id.* at 1375. The *Bristol-Myers* court similarly held that preamble language reciting “[a] method for treating a cancer patient to effect regression of a taxol-sensitive tumor, said method being associated with reduced hematologic toxicity” did not limit the treatment method claim because it was “only a statement of purpose and intended result. The expression does not result in a manipulative difference in the steps of the claim.” *Id.* at 1375-76.

ANALYSIS

Appellants’ arguments do not persuade us that the Examiner failed to establish that it would have been *prima facie* obvious for one skilled in the art to detect NANBV seroconversion using both a capsid antigen and the C-100-3 antigen, or that the secondary considerations raised by Appellants are sufficient to overcome the *prima facie* case of obviousness.

Houghton does not disclose performing the assay with a combination of those two antigens, as required by claim 141. However, as the Examiner points out, Houghton discloses a process of detecting anti-NANBV antibodies in a body fluid sample, the process having each of steps (a), (b), and (c) recited in claim 141 (*see* FF 2 and 4), with the exception of using the claimed combination of NANBV capsid antigen and C-100-3 antigen. Houghton, however, discloses the desirability of using NANBV capsid antigens to detect anti-NANBV antigens (*see* FF 4-7), the desirability of using the C-100-3 antigen in the same way (*see* FF 8-9), and the desirability of using combinations or panels of antigens to detect anti-NANBV antibodies (*see* FF 3 and 10).

We therefore agree with the Examiner that a person of ordinary skill in the art, advised by Houghton that combinations of different antigens were useful in detecting anti-NANBV antibodies in fluid samples, and also advised that capsid antigen and C-100-3 antigen were both useful in such assays, would have been prompted to combine the two antigens for use in the assays. Thus, Houghton would have suggested performing all of the claimed steps, using the claimed combination of antibodies, to a person of ordinary skill in the art.

We note that the preamble of claim 141 recites that the claimed method is “for detecting seroconversion . . . at early times after infection.” We also note that, with respect to the antigens useful in anti-NANBV antibody assays, Houghton does not differentiate between detecting early or late infection, but instead suggests that the test is generally applicable for detecting antibodies in any patient (*see* FF 2, 4).

However, as noted above, a preamble recitation that merely expresses the purpose of performing the claimed steps is not a limitation on the process where the body of the claim fully sets forth the steps required to practice the claimed process, and where the preamble recitation does not affect how the claimed steps are to be performed. *Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d at 1375-76.

In the instant case, none of the steps recited in the body of claim 141 requires testing any specific set of patients, or excludes any patients from being tested. Moreover, the body of the claim fully sets forth the steps required to achieve the intended result, and the preamble recitation does not affect how the claimed steps are to be performed. The preamble recitation in claim 141 therefore does not serve to distinguish the claimed assay from the generally applicable assay disclosed by Houghton.

Moreover, as Appellants admit, the use of capsid antigen in an anti-NANBV antibody assay necessarily results in detection of antibody at early times of infection, given the appropriate patient (*see* FF 12). Thus, because Houghton suggested testing all potentially infected patients by performing an assay having all of the claimed steps, and also suggested using combinations of viral epitopes including the claimed antigens, we agree with the Examiner that claim 141 would have been *prima facie* obvious to a person of ordinary skill in the art.

Appellants argue that in determining whether capsid antigens would be useful for assaying fluid samples for anti-NANBV antibodies, Houghton used only rudimentary assays of uncertain repeatability to show that capsid antigens were immunogenic (App. Br. 11-12). Appellants further argue that only incomplete testing of capsid antigens was performed, and that, given

the disclosure in Figure 65 of Houghton and its accompanying disclosure, the most reasonable interpretation is “that Houghton provides no motivation, or even the remotest suggestion that the capsid had, in fact, exhibited a unique capacity to serve as an early marker for the appearance of anti-HCV antibodies” (*id.* at 15; *see also* Reply Br. 5-6).

Appellants argue that one of ordinary skill in the art would in fact have been dissuaded from combining the capsid and C-100-3 antigens because Houghton’s Figure 65 shows that the capsid antigen and C-100-3 antigens have the same reactivities, with the exception of the Convalescent C-100 sample, which Appellants urge as necessarily being a test of later infection, rather than the early infection assayed in the claimed process (App. Br. 15-17).

Appellants concede that both capsid and C-100-3 antigens are among five antigens described by Houghton as being “very immunogenic” (*id.* at 17 (quoting Houghton, col. 83, l. 20 (FF 6))). However, Appellants argue, that term is meaningless because Houghton does not disclose which of the “numerous” potential combinations of antigens “are possible (pairs, triplets, etc.). Therefore it is unreasonable to conclude that all of the hundreds and thousands of combinations were obvious given the large number of possible combinations, especially since Houghton provides no reason to expect that any combination will reduce the incidence of false negatives” (App. Br. 18).

We do not find Appellants’ arguments persuasive. As pointed out above, the preamble recitation that the process is “for detecting seroconversion . . . at early times after infection” fails to distinguish the claimed assay from the generally applicable assay disclosed by Houghton. Thus, while Appellants urge that Houghton would not have motivated one of

ordinary skill to detect NANBV antibodies at early times in infection, claim 141 does not contain any positively recited process steps or limitations that differentiate it from Houghton's processes.

Moreover, even assuming for argument's sake that the claimed use of capsid antigen inherently confers early infection-detecting capability on the process of claim 141, Houghton discloses and claims using an antigen, HCV capsid antigen (*see* FF 4), admitted by Appellants (FF 12) as necessarily detecting anti-NANBV antibodies in fluid samples from individuals at early stages of infection. Thus, Houghton differs from claim 141 only in that Houghton's assay does not combine the early infection-detecting capsid antigen with C-100-3 antigen in the anti-NANBV assay.

However, Houghton discloses that it is desirable to use combinations, or "panels," of antigens when testing fluid samples for anti-NANBV antibodies (Houghton, col. 84, l. 58 (FF 10; *see also* FF 3)). Moreover, Houghton discloses that of the antigens tested, both capsid and C-100-3 antigens are among only five antigens described as being very immunogenic (FF 7, 8). Because Houghton discloses the desirability of performing anti-NANBV antibody assays with combinations of antigens, and because Houghton discloses that capsid and C-100-3 antigens are among the five most immunogenic antigens disclosed (FF 6-8), we do not agree with Appellants that one of ordinary skill in the art would have lacked impetus for combining capsid and C-100-3 antigens, nor do we agree with Appellants (App. Br. 19-21) that such a combination would be based only on hindsight.

Moreover, as Appellants point out, the C-100 negative sample in Figure 65 in fact reacts with capsid antigen CA290a, and therefore has a different reactivity than C-100-3 antigen (FF 11). Because one of ordinary

skill in the art would have been prompted to include antigens of different reactivities to ensure antibody detection, we do not agree with Appellants that one of ordinary skill would have failed to combine capsid and C-100-3 antigens.

Appellants argue that the Examiner improperly relied on inherency to show prima facie obviousness (App. Br. 22; *see also* Reply Br. 5-8). We are not persuaded by these arguments.

While it might be true that Houghton does not explicitly disclose that capsid antigens inherently detect anti-NANBV antibodies at early stages of infection, Houghton nonetheless explicitly discloses, and claims, that those antigens should be used in an assay for detecting anti-NANBV antibodies (*see* FF 4). The Examiner's prima facie case of obviousness is therefore not based on an undisclosed property of the capsid antigens, but instead on Houghton's explicit disclosure of the desirability of using those antigens in the assay. As Appellants admit, capsid antigens inherently have the capacity to the capacity to detect anti-NANBV antibodies in early infection, given the appropriate patient (FF 12).

Appellants argue that Houghton "disclosed a broad selection of antigens any one or ones of which could have been selected as the lead antigen for further investigation, but the most highly immunogenic of which were reported to be the same as C-100, a failure in the detection of early NANBV detection" (App. Br. 24); thus, the claimed combination of antigens would not have been obvious to one of ordinary skill in the art, given the decisions in *KSR* and *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350 (Fed. Cir. 2007) (App. Br. 22-25).

We are not persuaded by these arguments. As pointed out above, claim 141 recites an anti-NANBV antibody assay using two of the five antigens disclosed by Houghton as being the most immunogenic, and therefore the most preferred, for detecting anti-NANBV antibodies. Thus, one of ordinary skill, combining antigens as directed by Houghton, would not have been presented with a broad selection of numerous potential antigens, but rather only a few.

Also, the fact that Houghton may not have explicitly disclosed assaying fluid samples from patients in the early stages of infection simply does not equate to a positive disclosure in Houghton that the capsid antigens failed to detect antibody at the early stages of infection. We therefore do not agree with Appellants that Houghton reports capsid antigen as being unable to detect early infection.

Appellants argue that Houghton failed to provide a reasonable expectation of success because Houghton “merely discloses an array of polypeptides from HCV and never recognized the difficulty of isolating the specific ones which would provide detection of HCV seroconversion at both early and chronic infection stages” (App. Br. 26). Appellants argue that because Houghton did not provide any guidance with respect to whether its antigens could be used to detect antibodies at early stages of infection, the “discovery of a method which does detect seroconversion at both [early and late] stages and reduce[s] false negatives was completely unpredictable” (*id.*).

We are not persuaded by this argument. While it may be true that Houghton does not explicitly disclose assaying fluid samples from patients in the early stages of infection, we do not agree with Appellants that that fact

would have dissuaded one of ordinary skill in the art from practicing the process recited in claim 141.

Rather, because Houghton discloses that assays using either of the claimed antigens detected anti-NANBV antibodies in serum from infected individuals (*see* FF 4-9), we agree with the Examiner that one of ordinary skill in the art would have had a reasonable expectation that combining those antigens would also result in antibody detection. That is, one of ordinary skill in the art had a reasonable expectation that practicing all of the steps positively recited in claim 141 would have resulted in antibody detection.

We note that the preamble of claim 141 recites “detecting seroconversion . . . at early times after infection.” However, claim 141 fails to positively recite any step or limitation that distinguishes the claimed process from that suggested by Houghton. Specifically, the positively recited steps of claim 141 are (a) reacting a body fluid sample with capsid and C-100-3 antigens, (b) allowing an immunoreaction to occur, and (c) detecting immunoreaction products. Because Houghton suggests that practicing those steps would have would have achieved a desirable result -- antibody detection in infected individuals -- we do not agree that Houghton fails to meet the reasonable expectation element of a *prima facie* case of obviousness with respect to claim 141.

Appellants argue that because Houghton failed to identify the problem of detecting antibodies in the early stages of infection, Houghton cannot properly be considered to render claim 141 obvious (App. Br. 27). We are not persuaded by this argument.

While it may be true that Houghton’s rationale for combining capsid and C-100-3 antigens is different than Appellants’, it is well settled that

claimed subject matter is properly considered obvious when the prior art suggests its practice, even when the underlying rationale differs from Appellants'. *See KSR*, 127 S. Ct. at 1741-1742 (“In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103.”); *see also In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) (“[T]he law does not require that the references be combined for the reasons contemplated by the inventor.”); *see also In re Lintner*, 458 F.2d 1013, 1016 (CCPA 1972) (“The fact that appellant uses sugar for a different purpose does not alter the conclusion that its use in a prior art composition would be prima facie obvious from the purpose disclosed in the references.”).

Appellants argue that a number of secondary considerations demonstrate the non-obviousness of the process recited in claim 141. Appellants first urge that “[t]he Petition to Make Special, filed February 24, 2006, evidences the commercial importance of this invention” (App. Br. 28).

We are not persuaded by this argument.

We note that “the Patent and Trademark Office (PTO) . . . must consider objective evidence of nonobviousness – e.g. commercial success.” *In re Huang*, 100 F.3d 135, 139 (Fed. Cir. 1996). However, Appellants have not explained how filing the cited petition demonstrates that the invention recited in claim 141 is particularly successful commercially, nor have Appellants provided any direct evidence, such as sales figures, of the alleged commercial success, nor have Appellants provided any evidence of a

connection between the alleged commercial success and the invention recited in claim 141. *Cf. id.* at 140.

Appellants argue that “[t]he known inadequacy of C-100-3 in the detection of some cases of seroconversion and the resulting incidence of false negatives is telling evidence of a felt need” (App. Br. 29 (citing Weiner⁵)). Thus, Appellants argue, “the failure of others including Houghton to satisfy that need are significant evidence of non-obviousness. . . . Appellant[s] solved a major public health problem” (*id.*).

We are not persuaded by this argument.

Establishing nonobviousness from the failure of others to invent the claimed subject matter requires “evidence that, notwithstanding knowledge of the references, the art tried and failed to solve the problem.” *In re Wright*, 569 F.2d 1124, 1127 (CCPA 1977). *See also, In re Kahn*, 441 F. 3d 977, 990 (Fed. Cir. 2006) (“Absent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness.” (quoting *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004))).

Appellants do not point to, and we do not see, evidence that others in the art, aware of Houghton’s disclosure, tried and failed to solve the problem of false negatives, or the problem of detecting anti-NANBV antibodies at early stages of infection. Nor do Appellants explain where Houghton discloses that it tried, but failed, to solve those problems.

While Houghton might not explicitly disclose testing fluid samples from individuals in the early stages of infection, that does not equate to a

⁵ Amy J. Weiner et al., *Detection of hepatitis C viral sequences in non-A, non-B hepatitis*, 335 *The Lancet* 1-3 (January 1990).

positive disclosure that Houghton made actual attempts at solving the problems of false negatives and early detection of anti-NANBV antibodies, but failed. Appellants therefore have not met the burden required to demonstrate nonobviousness based on the failure of others.

Appellants urge that the data presented in the Specification (Spec. 104 (FF 12)) “provide the unexpected result from using capsid antigen together with the C-100-3 antigen in an HCV assay” (Reply Br. 2). Specifically, Appellants argue that they

found that the capsid antigen binds to anti-capsid antibodies (not recognized by C-100 antigen), and provides for detection of HCV seroconversion at early times after infection. The C-100-3 antigen (“Anti HCV” in Table 5), detects those antibodies which the capsid antigens fail to detect, *viz.*, those anti C-100-3 antibodies present in chronic or late HCV infection. Thus, the combination for the first time provided detection of infection over the full span of times following exposure to HCV. This provided an important breakthrough in HCV detection and it is neither inherent in nor obvious from [Houghton].

(*Id.*; *see also* Reply Br. 2.)

We do not find Appellants’ arguments persuasive. It is well settled that “when unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art.” *In re Baxter-Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991).

In the instant case, as discussed above, Houghton clearly teaches the desirability of using capsid antigens in an anti-NANBV assay having all of the steps recited in claim 141 (*see* FF 7, 10; *see also* FF 4 (claim 9 of Houghton)). Therefore, the sole difference between Houghton and claim 141 is that claim 141 requires including C-100-3 antigen in the assay in

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addition to capsid antigen. Appellants have not presented, and we do not see, a comparison between an assay performed using only capsid antigens, as taught by Houghton, and an assay performed using the steps and antigens recited in claim 141. Because Appellants have not compared the claimed process to the closest prior art process, we do not agree that the claimed process has been shown to be non-obvious over Houghton's process.

In sum, we do not agree with Appellants that the Examiner failed to properly interpret Houghton's teachings, or properly weigh the secondary evidence, in concluding that claim 141 would have been obvious to a person of ordinary skill in the art. We therefore affirm the Examiner's rejection of claim 141 under 35 U.S.C. § 103(a) as being unpatentable over Houghton.

Because they were not argued separately, claims 143, 144, 146, and 147 fall with claim 141. *See* 37 C.F.R. § 41.37(c)(1)(vii).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Ssc:

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