IN THE UNITED STATES COURT OF FEDERAL CLAIMS

OFFICE OF SPECIAL MASTERS

COLLEEN TORBETT,	*	
	*	No. 99-660V
Petitioner,	*	Special Master Christian J. Moran
	*	
v.	*	Filed: September 11, 2008
	*	Reissued for publication: Oct. 2, 2008
SECRETARY OF HEALTH	*	
AND HUMAN SERVICES,	*	hepatitis B vaccine, autoimmune
	*	hepatitis, entitlement
Respondent.	*	
	*	

Ronald C. Homer and Sylvia Chin-Caplan, Conway, Homer & Chin-Caplan, P.C., Boston, Massachusetts for petitioner;
Althea Davis and Rebecca Trinrud, Department of Justice, Washington, D.C. for respondent.

PUBLISHED DECISION DENYING COMPENSATION[*]

Colleen Torbett filed a petition seeking compensation under the National Vaccine Injury Compensation Program. 42 U.S.C. §§ 300aa-1 et seq. Ms. Torbett claims that the hepatitis B vaccine, which she received in three doses in 1996, caused her to suffer autoimmune hepatitis. See Amended Petition, filed April 10, 2006.

[*] The decision as originally issued on September 11, 2008, informed the parties that they may propose redactions of certain material. See 42 U.S.C. § 300aa-12(d)(4)(B); Vaccine Rule 18(b). However, neither party did so in the time permitted by Vaccine Rule 18(b).

Consequently, this decision is being released for publication with only slight modifications. This reissued decision corrects various non-substantive typographical or grammatical errors.

The evidence demonstrates that Ms. Torbett is not entitled to compensation. She has not established any of the required elements. Additionally, the evidence also establishes a more likely cause for her autoimmune hepatitis, her use of a drug called minocycline.

I. Facts

Ms. Torbett was born on March 15, 1957. Before receiving the vaccination, Ms. Torbett was seeing a dermatologist for acne. The relevant records date back to 1989. From 1990 to July 1996, Ms. Torbett was using a gel with benzamycin, washing her skin with benzac, and taking doxicycline. Exhibit 5 at 1-6. In February 1996, she started taking diclofenac, which is also called Cataflam. Exhibit 4 at 58; tr. 1479. In July 1996, the doctor stopped the doxicycline and started minocycline. Exhibit 5 at 6. As will be discussed at length below, her use of minocycline is a significant issue in this case because Dr. Koff, an expert retained by respondent, attributes the autoimmune hepatitis to the minocycline.

In addition to her acne, or more precisely to her acne medication, Ms. Torbett's sinus condition is potentially relevant to this case. Before the vaccination, she visited a doctor on occasion for trouble with her sinuses. Exhibit 11 at 4 (visits on May 11, 1994, and September 11, 1994); exhibit 1 at 42-44 (visits on June 23, 1995; July 12, 1995; and October 30, 1995). These visits appear to be isolated episodes. None of the doctors suggest that the troubles with her sinuses are symptoms of an underlying chronic disease.

In 1996, Ms. Torbett was working as a teacher of physical education within the Cincinnati Public Schools. Her duties included teaching special education students. Consequently, according to Ms. Torbett, the school system recommended that she be vaccinated against hepatitis B. Exhibit 13 (affidavit of Ms. Torbett, signed July 10, 2000) ¶ 1; see also 29 C.F.R. § 1910.1030(f) (1995) (regulation of the Occupational Safety and Health Administration requiring employers to offer the hepatitis B vaccine to employees with a potential "occupational exposure" to the hepatitis B virus).

Ms. Torbett received the first dose of the hepatitis B vaccine on January 29, 1996. Exhibit 12 at 1. She visited her doctor, Dr. Grainger, on February 9, 1996, because she was feeling dizzy for "a day and a half." She also had been taking Sudafed for two weeks due to "some mild sinus congestion." Exhibit 1 at 41. (If Ms. Torbett's statement that she was taking Sudafed for two weeks is accurate, then she started taking this medicine before she received the hepatitis B vaccine.) Dr. Grainger prescribed Claritin and recommended that she return in four or five days if she was not better. Id. Presumably, Ms. Torbett did improve because her next visit to Dr. Grainger did not occur until December. Id. at 40.

The second dose of the hepatitis B vaccine was given to Ms. Torbett on February 29, 1996. Exhibit 12 at 1. The medical records do not indicate any visits immediately thereafter. According to Ms. Torbett's affidavit from 2000, she was having sinus problems in April, and she also noticed stiffness in her joints. Exhibit 13 ¶ 3.

As mentioned above, in July 1996, Ms. Torbett started taking minocycline for her acne. Exhibit 5 at 6.

On August 20, 1996, Ms. Torbett received the third dose of the hepatitis B vaccine. Exhibit 12 at 1. On the following day, Ms. Torbett saw her gynecologist for irregular bleeding. The notes from this visit, which are sparse, do not suggest that Ms. Torbett was having other medical problems. Exhibit 7 at 7-8.

According to Ms. Torbett's affidavit, she started having joint pains "after" the third dose of the hepatitis B vaccine. Although Ms. Torbett's statement is not precise as to how much time elapsed, the context suggests that Ms. Torbett intended to assert that the joint pain began between August and December. Exhibit 13 ¶ 4. However, between August and December, she did not see any doctors.

Ms. Torbett's next visit to a doctor was again to see her general physician, Dr. Grainger, on December 2, 1996. She stated that she was experiencing soreness in her right elbow for about three weeks. Ms. Torbett stated that the soreness was worse with activity, something that probably happened frequently because of her duties as a gym teacher and gymnastics instructor. Dr. Grainger diagnosed the problem as "lateral epicondylitis." Exhibit 1 at 40. Non-medical people would probably use the term "tennis elbow" for this condition. See Dorland's Medical Dictionary (30th ed. 2003) at 625; exhibit 1 at 35. She followed up for her elbow pain three times, the last visit occurring on February 10, 1997. Exhibit 1 at 37-39.

Beginning in June 1997, Ms. Torbett visited Dr. Grainger's office about once every month. Between June 1997 and December 1997, she had nine visits. During these visits, she complained about trouble with her sinuses, headaches (especially associated with her menstrual period), a different type of elbow pain, arthritis, upper respiratory infections, joint pain and fatigue. Exhibit 1 at 29-36, 58-59. A set of routine blood tests in August 1997 showed that two liver function tests produced elevated results. Exhibit 1 at 49; see also exhibit 4 at 28. However, no contemporaneous record notes that Ms. Torbett should seek additional treatment. See exhibit 1 at 58 (visit on December 19, 1997, for follow up on blood work results).

During the latter half of 1997, Ms. Torbett also continued to take the medicines prescribed by her dermatologist. Exhibit 5 at 6. However, nothing in the records from Dr. Grainger's office indicates that these doctors knew about her prescriptions. See exhibit 1. Likewise, her dermatologist also seems not to have known about her other problems. See exhibit 5. In this time, Ms. Torbett also consulted her gynecologist three times. Exhibit 7 at 6.

In 1998, Ms. Torbett continued to go to Dr. Grainger's office. (It appears that she was primarily seen by certified physician's assistants.) She complained about allergies and sinus problems. Exhibit 1 at 1-2.

In April 1998, Dr. Grainger referred Ms. Torbett to an allergist, Dr. Manuel Villareal. Dr. Villareal saw Ms. Torbett about once per month for the remainder of 1998. He was attempting to treat her sinus problems, which he diagnosed as non-allergic rhinitis and possibly chronic sinusitis. Exhibit 2 at 1-21. During this time, Ms. Torbett recounts that she was exhausted. Exhibit 13 ¶ 7.

At some point during the summer of 1998, Ms. Torbett again started taking diclofenac. Exhibit 4 at 27 (report of Dr. Temming, dated October 29, 1998); id. at 58. Diclofenac is identified by respondent's expert, Dr. Koff, as a possible cause of Ms. Torbett's autoimmune hepatitis. Exhibit C at 3.

In the fall of 1998, Ms. Torbett was still being treated by Dr. Grainger and physician's assistants within his office. Her primary complaints were about pains in her joints, not problems with her sinuses. Exhibit 1 at 4-7.

In October 1998, Dr. Grainger referred Ms. Torbett to Dr. Joseph Temming, a rheumatologist. Dr. Temming's medical records indicate that Ms. Torbett had been taking minocycline and diclofenac. The notations from physical examination showed tenderness and stiffness in some joints. Consequently, he ordered, among other things, blood work for her liver function tests. Exhibit 4 at 28-29. The liver function tests showed abnormally high results. Id. at 14. Her anti-nuclear antibodies were negative. Id. at 19.

At the ensuing consultation, Dr. Temming stated that Ms. Torbett should stop using diclofenac. He considered the possibility that Ms. Torbett had autoimmune hepatitis, although he thought this condition was unlikely. Exhibit 4 at 27. He ordered follow up blood work. These tests, too, were elevated. Id. at 16. Because of the elevated liver function tests, she was referred to a hepatologist, Dr. Philip Williams. Id. at 12.

At the initial visit, Dr. Williams obtained a history from Ms. Torbett. He, then, obtained her records from Dr. Grainger and Dr. Temming. Based upon this information, Dr. Williams considered autoimmune hepatitis to be a possibility. He believed that a liver biopsy could establish this diagnosis. Exhibit 3 at 1-3. While reports from Dr. Temming note that Ms. Torbett was taking minocycline and diclofenac, this information is not prominent and is not specifically mentioned by Dr. Williams in his reports.

On November 19, 1998, Ms. Torbett had a liver biopsy. The pathologist interpreted the results as "consistent with an autoimmune form of chronic hepatitis. The prior history of steroid therapy probably reduced the level of inflammatory activity within the liver." Exhibit 3 at 10. The basis for the pathologist's notation that Ms. Torbett used steroids previously is not clear. Medical records do not show a prior use of steroids. See tr. 1262-67, 1448-50.

After Dr. Williams received the results of the liver biopsy, Dr. Williams believed that autoimmune hepatitis was the most likely diagnosis. He, therefore, started Ms. Torbett on prednisone at 10 milligrams per day. Exhibit 3 at 4 (report from December 1, 1998).

After Ms. Torbett was taking prednisone for about three weeks, her blood was drawn. The results of these tests showed an improvement (a decrease) in her liver function tests. Id. at 13. Dr. Williams stated that this change supported the diagnosis of autoimmune hepatitis. She also apparently had an improvement in her joint pain. Id. at 6.

In late December, Ms. Torbett developed dyspepsia, which became severe enough that she stopped taking the prednisone. After she discontinued prednisone, her joint pain returned. Whether her liver function changed apparently was not tested. At her next appointment with Dr. Williams, which was on January 4, 1999, Dr. Williams started prednisone again. Exhibit 3 at 6.

In February 1999, Dr. Williams again obtained blood for liver function tests. These results were normal. Exhibit 3 at 6-7. On February 22, 1999, Ms. Torbett saw her dermatologist and relayed that she was diagnosed with autoimmune hepatitis in November 1998. The dermatologist stopped the minocycline. Exhibit 5 at 7.

On March 26, 1999, Ms. Torbett had another series of blood tests performed. The results for her liver function tests were in the normal range. Exhibit 1 at 26.

On April 1, 1999, Ms. Torbett returned to Dr. Williams for follow-up of her autoimmune hepatitis, which Dr. Williams considered to be "well controlled chemically." The office notes indicate that Ms. Torbett was still having joint problems and fatigue. Dr. Williams suspected that she may have "other auto immune problems." According to him, "[p]atients with mild auto immune chronic active hepatitis seldom have nearly the extent of symptoms that she complains of." These notes do not indicate that Ms. Torbett told Dr. Williams that she had stopped taking minocycline as directed by her dermatologist. Exhibit 3 at 7.

After 1999, Ms. Torbett has had many other medical problems. Although these problems are described in the various exhibits, they appear not relevant to the pending question, which is whether Ms. Torbett has established by a preponderance of the evidence that the hepatitis B vaccine caused her autoimmune hepatitis.

On April 8, 1999, Ms. Torbett saw Dr. James Caldwell, whom the State Retirement System of Ohio retained to determine whether Ms. Torbett was disabled from teaching. Although Dr. Caldwell was retained by a party with a financial interest in the outcome of his examination, Dr. Caldwell's analysis is potentially relevant. He found that Ms. Torbett was not disabled, primarily due to her continuing an exercise routine. Exhibit 1 at 101-02; see also id. at 104 (report, dated July 6, 1999).

By 2001, Ms. Torbett's hepatitis had stabilized with the help of several medications. Exhibit 43 at 5 (letter from Dr. Raymond J. Mis, a gastroenterologist). She has maintained this state for several years. Id. at 1-4. Nevertheless, she does not work. She is easily fatigued and has pain throughout her body. Exhibit 49 (supplemental affidavit of Ms. Torbett, signed July 16, 2007) ¶¶ 11-12.

II. Procedural History

Ms. Torbett filed her petition on August 4, 1999. She did not file any medical records then. Instead, medical records were filed for the first time on August 22, 2000. Respondent filed his report, pursuant to Vaccine Rule 4, on November 29, 2000, and denied that Ms. Torbett was entitled to compensation. Ms. Torbett periodically filed additional records, including eight exhibits on December 27, 2004, and six exhibits on May 25, 2005.

This case was assigned to the undersigned special master in 2006. This case generally moved at about the same pace as other cases in which the petitioner alleged that the hepatitis B vaccine caused them to suffer from autoimmune hepatitis. Initially, this group included four other cases in which the same attorney represented all petitioners. Later, this group expanded to include two more cases in which petitioners were represented by two different attorneys. Before the hearing, Ms. Torbett filed a statement consenting to the disclosure of information to the parties in the other cases.

Ms. Torbett filed updated medical records in April 2006. She also filed an amended petition, clarifying that she claims that the hepatitis B vaccination caused her to suffer autoimmune hepatitis.

On May 26, 2006, Ms. Torbett filed the expert report and curriculum vitae of Dr. Joseph Bellanti, an immunologist. Dr. Bellanti offered the opinion that Ms. Torbett suffers from autoimmune hepatitis and that the hepatitis B vaccine caused this condition. Exhibit 30. Respondent, in turn, filed expert reports from Dr. Burton Zweiman, an immunologist, and Dr. Raymond Koff, a specialist in hepatology, on November 13, 2006. Exhibits A and C. Both Ms. Torbett and respondent filed medical literature cited by the experts.

On April 3, 2007, a hearing was scheduled to take place on September 17-19, 2007. Several factors contributed to the unusually long time between the scheduling of the hearing and the holding of the hearing. First, petitioners preferred that this group of cases be tried at one time. A single trial is more efficient in saving time of the attorneys, the doctors, and the Court. Second, two cases required small amounts of additional time to attain the same procedural posture as the other cases. Third, the personal and professional commitments of the many attorneys, three doctors and the Court prevented an earlier date for holding the hearing.

The interval between the scheduling of the hearing and the commencement of the hearing supported extending to Ms. Torbett the opportunity to retain an additional expert. Ms. Torbett

did not request this opportunity. However, the Court recognized that respondent, but not Ms. Torbett, presented a specialist in hepatology (Dr. Koff). The April 3, 2007 order established a schedule for the filing of another expert, and, despite respondent's objection, set a deadline as August 1, 2007.

Ms. Torbett did not file another expert report. The omission of an expert on gastroenterology or hepatology affects the outcome of this litigation. For the reasons explained below, Dr. Koff's opinion that the cause of Ms. Torbett's autoimmune hepatitis is her use of minocycline is much more persuasive than Dr. Bellanti's opinion that the cause was the hepatitis B vaccinations.

The hearing took place in two sessions. In the first session, which was held across three days in September 2007, the petitioners presented most of their evidence that the hepatitis B vaccine "can cause" autoimmune hepatitis in general. Respondent disputed this point and presented evidence in response. Tr. 6 through 203. The first session also included testimony about some individuals specifically.

The second session was held in two days in March 2008.[1] During this session, the parties presented their remaining evidence regarding whether the hepatitis B vaccination can cause autoimmune hepatitis. The second session also completed the discussion of individual cases. For example, Ms. Torbett's case was discussed during the fourth and fifth days of the hearing. Tr. 1223-1558.

Following the filing of the transcript, a status conference was held on July 7, 2008. The parties confirmed that they did not want to file briefs after the hearing. Thus, this case is ready for adjudication.

III. Standards for Adjudication

In this case, the evidence includes conflicting opinions from each party's experts. The persuasiveness of the experts must be evaluated, and the testimony of one side's expert may be rejected when a reasonable basis supports such a rejection. Burns v. Sec'y of Health & Human Servs., 3 F.3d 415, 417 (Fed. Cir. 1993). A decision about the persuasiveness of an expert is virtually not reviewable on appeal. Bradley v. Sec'y of Health & Human Servs., 991 F.2d 1570, 1575 (Fed. Cir. 1993); Sword v. Sec'y of Health & Human Servs., 44 Fed. Cl. 183, 188 (1999) (noting that special masters acquire "specialized knowledge and expertise" to resolve disputes between experts).

[1] The length of time between the two sessions was longer than originally anticipated due to unexpected health troubles in a family member of an expert.

IV. Analysis

The experts reach different conclusions. Dr. Bellanti believes that the hepatitis B vaccine can cause autoimmune hepatitis and that the hepatitis B vaccine did cause Ms. Torbett's autoimmune hepatitis. In contrast, Dr. Zweiman believes that the evidence does not show that the hepatitis B vaccine can cause autoimmune hepatitis. Therefore, it follows that he believes that the hepatitis B vaccine did not cause autoimmune hepatitis for Ms. Torbett specifically. Dr. Koff's opinion is similar to Dr. Zweiman's, although from a different specialty. While agreeing that a causal relationship between the hepatitis B vaccine and autoimmune hepatitis has not been established generally, Dr. Koff points to Ms. Torbett's use of minocycline and diclofenac as the more likely cause of her liver problems.

Dr. Bellanti opines that the hepatitis B vaccine "can cause or significantly contribute to the development of autoimmune hepatitis." Exhibit 30 at 6. He offers several related points. First, he presents a syllogistic argument that given (a) it is generally understood that if a live virus can cause a condition, then the vaccine for that virus can also cause that condition, and (b) the hepatitis B virus can cause autoimmune hepatitis, the logical conclusion is © the hepatitis B vaccine can cause autoimmune hepatitis. Second, he presents an argument by analogy. He contends that vaccines can cause autoimmune conditions. Because autoimmune hepatitis is, as evident by its name, an autoimmune condition, a vaccine can cause autoimmune hepatitis. He attempts to strengthen this analogy by presenting different mechanisms explaining how the hepatitis B vaccine can cause autoimmune hepatitis. Exhibit 30 at 3-5 & attachments at tabs A-H.

Dr. Bellanti proceeds to a second step. He believes that Ms. Torbett's autoimmune hepatitis "was likely due to her hepatitis B immunizations." He reaches this conclusion because "[t]he temporal relationship between her immunizations and the onset of symptoms is medically appropriate and there is no other likely cause identified in the record." Exhibit 30 at 6. To support Dr. Bellanti's theory about the temporal relationship, Ms. Torbett presented medical articles that indicate that joint pain sometimes precedes the onset of the symptoms of autoimmune hepatitis. Exhibits 32-40.

Ms. Torbett has not presented any persuasive evidence explaining that the hepatitis B vaccination caused her autoimmune hepatitis. For the reasons presented below, Ms. Torbett fails to meet her burden of proving the elements listed in Althen v. Sec'y of Health and Human Servs., 418 F.3d 1274, 1278 (Fed. Cir. 2005). Separately, and additionally, it is much more likely that Ms. Torbett's use of minocycline caused her autoimmune hepatitis. See section IV.D., below.

To prove causation in fact, a petitioner must establish at least three elements. The petitioner's

> burden is to show by preponderant evidence that the vaccination brought about [the] injury by providing: (1) a medical theory

> causally connecting the vaccination and the injury; (2) a logical sequence of cause and effect showing that the vaccination was the reason for the injury; and (3) a showing of a proximate temporal relationship between vaccination and injury.

Althen, 418 F.3d at 1278. Proof of medical certainty is not required; a preponderance of the evidence suffices. Bunting v. Sec'y of Health and Human Servs., 931 F.2d 867, 873 (Fed. Cir. 1991).

A. Medical Theory

Dr. Bellanti presented four theories possibly explaining how autoimmune diseases arise. They are: (a) molecular mimicry, (b) bystander theory, (c) polyclonal activation, and (d) a dysregulation in the function of T-cells. Tr. 24.[2] For the reasons set forth in the following sections, none of these theories presents a reliable explanation of how the hepatitis B vaccine can cause autoimmune hepatitis.

The theory connecting the vaccine to the injury "must be supported by a sound and reliable medical or scientific explanation." Knudsen v. Sec'y of Health & Human Servs., 35 F.3d 543, 548 (Fed. Cir. 1994). To determine whether an expert's theory is reliable a special master may use the factors set forth in Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 594 (1993). Terran v. Sec'y of Health & Human Servs., 195 F.3d 1302, 1316 (Fed. Cir. 1999) (affirming special master's use of Daubert in vaccine program cases). After Terran, decisions from judges of the Court of Federal Claims have consistently cited to Daubert. E.g. De Bazan v. Sec'y of Dept. of Health & Human Servs., 70 Fed. Cl. 687, 699 n.12 (2000) ("A special master assuredly should apply the factors enumerated in Daubert in addressing the reliability of an expert witness's testimony regarding causation."), rev'd on other grounds, No. 2008-5013, – F.3d –, 2008 WL 3927499 (Fed. Cir. Aug. 28, 2008); Campbell v. Sec'y of Dept. of Health & Human Servs., 69 Fed. Cl. 775, 781 (2006); Piscopo v. Sec'y of Health & Human Servs., 66 Fed. Cl. 49, 54 (2005).

Daubert lists several non-exhaustive factors that may be considered in assessing the reliability of an expert's opinion. Kumho Tire Co., Ltd. v. Carmichael, 526 U.S. 137, 149 (1999). These factors include whether the expert's opinion is well accepted in the relevant community. Daubert, 509 U.S. at 594; see also McDowell v. Brown, 392 F.3d 1283, 1299 (11th Cir. 2004) (affirming district court's exclusion of expert whose theory lacked "testing, peer review, a potential error rate, and general acceptance."); Sullivan v. United States Dep't of Navy, 365 F.3d 827, 834 (9th Cir. 2004) (reversing exclusion of expert whose theory was generally accepted).

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[2] Petitioner's counsel suggested that "loss of tolerance" also constitutes a medical theory. Tr. 26. However, loss of tolerance is not a theory explaining the origins of autoimmune diseases. Loss of tolerance describes the autoimmune disease itself.

A closely related factor is how peer-reviewed articles have evaluated a theory. This point may also be considered in weighing the value of a medical opinion. Id.; see also Merck & Co., Inc. v. Teva Pharmaceuticals USA, Inc., 395 F.3d 1364, 1374 (Fed. Cir. 2005); Libas v. United States, 193 F.3d 1361, 1366-67 (Fed. Cir. 1999); Knight v. Kirby Inland Marine Inc., 482 F.3d 347, 354 (5th Cir. 2007) (stating a lack of textual support may "go to the weight, not the admissibility" of the expert's testimony); Waleryszak v. Sec'y of Health & Human Servs., 45 Fed. Cl. 573, 578-79 (1999), appeal dismissed, 250 F.3d 753 (Fed. Cir. 2000). These factors are useful in evaluating each of the four theories proposed by Dr. Bellanti.

1. Molecular Mimicry

Dr. Bellanti's first theory to explain how the hepatitis B vaccine can cause autoimmune hepatitis is molecular mimicry. Dr. Bellanti stated that among the different theories, he favored molecular mimicry and the fourth-listed theory, a deficiency in T-regulatory cells, as the theories most likely to be valid. Tr. 90, 201. Ms. Torbett and Dr. Bellanti have not established, by a preponderance of the evidence, that molecular mimicry is a reliable theory to explain a causal relationship between the hepatitis B vaccine and autoimmune hepatitis.[3]

Molecular mimicry is based upon a premise that some parts of the human body share a sequence of proteins with the foreign substance, here the hepatitis B vaccine. Tr. 23, 130-31; exhibit 30 at 4. This sharing of protein sequences is known as homology. Tr. 171-72.

For the hepatitis B vaccine to cause autoimmune hepatitis via molecular mimicry, cells within the liver must share homology with the hepatitis B vaccine. Tr. 172. The hepatitis B vaccine is a genetically engineered recombinant vaccine consisting of a single protein, the surface antigen. Tr. 84-85, 116. Therefore, comparing the protein sequences in the hepatitis B vaccine to liver proteins would be easier than comparing liver proteins to a more complex vaccine, such as one containing an attenuated virus. See tr. 392-93.

However, despite the possibility that there could be homology between the hepatitis B vaccine and liver proteins, no homology has been found. Tr. 86-87 (Dr. Bellanti), 131, 173 (Dr. Zweiman); 616-17 (Dr. Bellanti). Without establishing this basic postulate, the reliability of molecular mimicry in this case is questionable.

Furthermore, an article presented by respondent's expert, Dr. Zweiman, caused Dr. Bellanti "to seek another explanation." Tr. 203. In the article, a set of researchers vaccinated people who already had chronic autoimmune hepatitis with the hepatitis B vaccine. If the hepatitis B vaccine could cause autoimmune hepatitis, the expected result is an aggravation or exacerbation of the underlying condition. However, the people's condition did not worsen. Tr. 129-30, 184-85; exhibit 1004 (J. Beran, Safety and Immunogenicity of a Combined Vaccine

[3] This decision does not comment upon whether molecular mimicry is a reliable theory connecting other vaccines and other diseases.

Against Hepatitis A and B in Patients with Autoimmune Hepatitis, 13 Cent Eur J Pub Health, 20-3 (2005)). This lack of an adverse consequence undermines the reliability of molecular mimicry as a theory.

Dr. Bellanti agreed. He stated the Beran article "doesn't support molecular mimicry . . . so we have to seek another explanation." Tr. 203; accord tr. 970. Dr. Bellanti's retreat from a theory that he proposed is a poor mark on his credibility as an expert.[4]

2. Bystander Activation

Dr. Bellanti's second theory to explain how the hepatitis B vaccine can cause autoimmune hepatitis is bystander activation, although this theory is not one he prefers. Tr. 24, 90, 201. Dr. Bellanti's explanation of this theory was confusing. He stated that the innocent bystander is "where an immune reaction occurs because of the cytokines and all of the other molecules are being synthesized a normal tissue is involved and damaged." Tr. 24. A preponderance of the evidence does not support a finding that bystander activation is a reliable theory linking the hepatitis B vaccine to autoimmune hepatitis.

Other than Dr. Bellanti's own testimony, Ms. Torbett presented little evidence to show that bystander activation is a reliable theory for this case. Dr. Zweiman's testimony supplied some confirmation that researchers have explored bystander activation in experimental models and have found it exists with other substances that stimulate the immune system. Tr. 180. However, Ms. Torbett did not present evidence to explain why this theory about some antigens provides information about the hepatitis B vaccine specifically. Because the hepatitis B vaccine contains a single, non-replicating protein, there is no evidence that this antigen causes any bystander activation.

With regard to the hepatitis B vaccine specifically, the Institute of Medicine ("IOM") has investigated the theory of bystander activation and found that this theory is weak. Exhibit 1005 (Institute of Medicine, Immunization Safety Review: Hepatitis B Vaccine and Demyelinating Neurological Disorders (Kathleen Stratton et al. eds. (2002)) 64, 69; tr. 138, 195, 883.

Dr. Bellanti presented no response to the Institute of Medicine's report, which had been filed before he testified. He was questioned about this report during cross-examination and merely said the IOM has its opinion. Tr. 89. Although given an opportunity to conduct re-direct examination, Ms. Torbett's counsel did not. Tr. 109.

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[4] A troubling aspect about Dr. Bellanti's retreat is that respondent presented the Beran article several months before Dr. Bellanti testified. This time was ample for Dr. Bellanti to reconsider his opinion about molecular mimicry. Nevertheless, Dr. Bellanti not only presented molecular mimicry as a theory, he also said it was a theory he "favored." Tr. 90, 201.

Reports from the IOM are favored, although not dispositive, in the Vaccine Program. Cucuras v. Sec'y of Health & Human Servs., 993 F.2d 1525, 1529 (1993) (finding that special master did not abuse his discretion in determinating that a 1991 IOM report was entitled to great weight); Cohen v. Sec'y of Health & Human Servs., Fed. Cl. 94-353V, 1998 WL 408784 *8 (Spec. Mstr. July 1, 1998). Furthermore, Dr. Zweiman explained why he thought the IOM's report is authoritative – primarily because the IOM draws experts from many different fields who are not biased or prejudiced in evaluating the evidence. Tr. 135-36.

Dr. Bellanti may disagree with the IOM's conclusion that the hepatitis B vaccine does not induce bystander activation. However, for Dr. Bellanti's disagreement to be relevant, his opinion must be reliable. Knudsen, 35 F.3d at 548. Reliability, at least in this context, requires that Dr. Bellanti offer some reason for disagreement. For example, a logical argument might be that research conducted after the IOM issued its report in 2002, which the IOM could not have considered, has raised doubts about the IOM's conclusion. But, Dr. Bellanti did not proffer any reasoning. Instead, his response to a question about the IOM's report was to say that the IOM has its "opinion." Tr. 89. Shortly following this passage, Dr. Bellanti again said that the authors of the IOM report "are entitled to their opinion. They are not infallible, and perhaps uninformed." Tr. 97.

Dr. Bellanti's disagreement with the IOM is neither reliable nor persuasive. The context of Dr. Bellanti's use of the term "opinion" is comparable to how people commonly express disputes over matters of style and taste. These can be matters of "opinion." The IOM's study is not an "opinion" in that sense. The IOM examined available data and reached a conclusion. If Dr. Bellanti believes that the IOM was "uninformed," then it is incumbent upon Dr. Bellanti to identify the information that the IOM lacked. Pointing out the fallibility of an investigation without specifying an error does not constitute relevant testimony.

As the party bearing the burden of proving that the hepatitis B vaccine caused autoimmune hepatitis, Ms. Torbett was responsible for presenting a reliable theory. Althen, 418 F.3d at 1278 (quoting Grant v. Sec'y of Health & Human Servs., 956 F.2d 1144, 1148 (Fed. Cir. 1992)). Ms. Torbett did not. Dr. Bellanti's assertion that the bystander activation theory is a reliable method to explain how the hepatitis B vaccine can cause autoimmune hepatitis is tantamount to a statement ipse dixit. Pursuant to Terran, which affirmed using Daubert in vaccine cases to evaluate an expert's theory, special masters are not required to accept an expert's theory merely because an expert himself said it. Kumho Tire Co., Ltd. v. Carmichael, 526 U.S. 137, 157 (1999) (quoting General Elec. Co. v. Joiner, 522 U.S. 136, 137 (1997)). "[W]ithout more than credentials and a subjective opinion, an expert's testimony that 'it is so' is not admissible." Hathaway v. Bazany, 507 F.3d 312, 318 (5th Cir. 2007) (citation and quotation marks omitted) (affirming district court's decision to exclude testimony of proposed expert). As such, a preponderance of the evidence indicates that bystander activation is not a reliable theory to explain how the hepatitis B vaccine could cause autoimmune hepatitis.

3. Polyclonal Activation

The third theory offered by Dr. Bellanti is known as polyclonal activation. This theory postulates that an antigen, such as the hepatitis B vaccine, stimulates the production of too many B-cells and that these excess B cells lead to autoimmune disease. Tr. 24 (Dr. Bellanti), 881 (Dr. Zweiman).

Other than Dr. Bellanti's own assertions, a minimal amount of evidence supports a finding that polyclonal activation is a reliable theory. First, Dr. Zweiman recognizes that some antigens will stimulate an immune response that is broad-based, not limited to a response against one antigen. Tr. 139. Thus, investigators have looked for polyclonal activation to explain autoimmune disease. Tr. 181. Whether polyclonal activation has actually been found to cause an autoimmune disease is not clear.

The second piece of evidence that lends some support to the polyclonal activation theory is the set of antibodies found in people with autoimmune hepatitis. People with autoimmune hepatitis sometimes have elevated levels of antibodies, but the presence of autoantibodies does not definitively establish that the person has an autoimmune disease. It is extremely important to note that the elevated antibodies have not been found to cause autoimmune hepatitis. Tr. 27, 135, 176, 462 (Dr. Koff), 618 (Dr. Bellanti), 922-23.

Despite some evidence supporting the reliability of the polyclonal activation theory in general, evidence about the hepatitis B vaccine is missing. According to Dr. Zweiman, there is no evidence that the hepatitis B vaccine is an antigen that induces polyclonal activation. Tr. 140, 881-82. The Institute of Medicine report underlies Dr. Zweiman's opinion. Exhibit 1005 (Institute of Medicine, Immunization Safety Review: Hepatitis B Vaccine and Demyelinating Neurological Disorders (Kathleen Stratton et al. eds. (2002)) at 64, 69.

Dr. Bellanti did not produce any affirmative evidence showing that the hepatitis B vaccine produces polyclonal activation. Because Dr. Zweiman presented his "no evidence" opinion during the first session, the nearly six months between sessions gave Dr. Bellanti sufficient time to counter Dr. Zweiman's assertion. In other contexts, Dr. Bellanti did in fact conduct additional research and presented new articles during the second session. See, e.g., tr. 1204-07. Dr. Bellanti's failure to present rebuttal articles about polyclonal activation strongly suggests that there are no articles showing that the hepatitis B vaccine stimulates polyclonal activation.

Without any information to suggest that Dr. Bellanti's assertion that the hepatitis B vaccine stimulates a "polyclonal activation" of the immune system resulting in autoimmune disease is reliable, Ms. Torbett fails to meet her burden of introducing reliable evidence. In short, on the one hand, there is Dr. Bellanti's testimony. This testimony is tempered by his admission that polyclonal activation is not a theory he favors. Tr. 90, 201. On the other hand, there is the testimony of Dr. Zweiman corroborated by the report from the IOM. When the

weight of the evidence so greatly favors one side, a finding that Dr. Bellanti's theory is reliable cannot be made.

4. Dysfunction in T-regulatory cells

Dr. Bellanti's fourth theory for explaining how the hepatitis B vaccine can cause autoimmune hepatitis "involves participation of CD4+ regulatory T cells." Exhibit 30 at 4. This theory involves a deeper understanding of the immune system, and is necessarily more complicated. The complication, however, is not the flaw. The problem with the "theory" is that it is not a theory that postulates how the hepatitis B vaccine can cause autoimmune hepatitis. Instead, the comment about dysfunction in T-regulatory cells is an observation about some people with autoimmune diseases. The observation exists without the hepatitis B vaccine.

To show how Dr. Bellanti's comments do not amount to a theory explaining a causal role for the hepatitis B vaccine, a portion of his report is quoted below. This passage is all that Dr. Bellanti wrote about T-regulatory cells. He states:

> These [T-regulatory cells] have been identified as the cells that maintain immunologic tolerance, the property of the immune system which distinguishes one's own tissues as self from those exogenous materials which are recognized as "non-self." The failure of, or escape from, normal suppression of reactivity against "self" has an essential role in the development of autoimmune disease. Studies suggest that a decrease in the number of regulatory T cells and their ability to expand may lead to autoimmune liver disease.

Exhibit 30 at 4. Noticeably absent from this passage is any reference to vaccines.

Dr. Bellanti's testimony did not fill this gap. He explained how T-regulatory cells function. Tr. 14-19. In doing so, he noted that a current theory to explain the pathogenesis of autoimmune disease is that the regulation of T-cells is not working properly. Tr. 16. Dr. Zweiman offered some limited support for the theory that immunologists believe that problems with T-regulatory cells may lead to autoimmune disease. Tr. 181-82, 1099.

As support for his assertion that a problem with regulatory T cells may contribute to causing autoimmune hepatitis, Dr. Bellanti identified an article by Longhi during the hearing. Tr. 45. Because this article seemed important, the Court introduced it as an exhibit during the hearing. Tr. 1103-04. On cross-examination, Dr. Bellanti tried to clarify his opinion. He stated:

> Whether [T-regulatory cells] produce, you know, specifically, you can say definitively they cause autoimmune hepatitis, I can't say that definitively, but I can say it's my opinion based on my knowledge, putting it all together that they do; that it in some way is related. It's more probable than not.

Tr. 91.

For sake of argument, Dr. Bellanti's assertion that a problem (an imbalance) with the regulatory T cells causes, in some way, autoimmune hepatitis can be accepted. (Dr. Zweiman did not agree with Dr. Bellanti on this point. Dr. Zweiman noted that although a problem with regulatory T cells may be associated with autoimmune hepatitis, it is unclear which came first. It is possible that the autoimmune hepatitis causes the defect in T regulatory cells. Tr. 143, 1131.) But, Dr. Bellanti's assertion again says nothing about the role of the hepatitis B vaccine. Questioning from the Court on the first day of the hearing revealed the hole in Dr. Bellanti's "theory." This passage is quoted at length to demonstrate the limits of Dr. Bellanti's statement:

> THE COURT: The T-regulatory deficiency, I understand you saying that the immune system gets out of balance. Is that right?
>
> THE WITNESS: Yes. There is an imbalance, that's correct.
>
> THE COURT: But is it your theory that something in the hepatitis B vaccine causes the T- cell regulatory deficiency?
>
> THE WITNESS: That isn't known, Your Honor. You know, the publication I think that was referred to in the article simply referred to deficiency in patients with autoimmune hepatitis. Whether it was the cause or the result, it isn't clear.
>
> If you ask my opinion, I would favor it being a preexisting deficiency, but I have no direct evidence for that. That would be speculative.
>
> THE COURT: You mean preexisting, existing before the introduction of the antigen?
>
> THE WITNESS: No. Because of the genetic relationships of the effects of genetic control on the immune system and because of the genetic relationships that are known to occur with patterns of certain HLA types in certain patients with autoimmune disease, this is a distinct possibility.
>
> Whether it will turn out to be, I don't know, but it's very attractive, and it is the center of current research in the field of immunology. This is a very hot field. You know, the regulation of the immune system, how antigen is recognized, processed and delivered determines in all cases the ultimate success or failure of elimination, and that ties in with autoimmune disease, but it's all inferential.
>
> THE COURT: Now, the imbalance in the T-regulatory system would be genetic-based?
>
> THE WITNESS: Yes.
>
> THE COURT: So is it your theory that the introduction of the hepatitis B vaccine would trigger the adverse effects of this imbalance?
>
> THE WITNESS: No, I would say that in certain genetically predisposed individuals, their response to certain vaccines leads to adverse

> effects due to this genetic inability to handle the antigen as that bell-shaped curve -- 95-99 percent of the population.
>
> There is [sic] these outliers that are responding differently, and those are the unfortunate ones that get into trouble with vaccines. There is documentation that there is a T-reg deficiency in autoimmune disease. Whether it's in the case of hepatitis B that was caused by the vaccine, or it was a preexisting condition which led subsequently to their autoimmune disease. I honestly don't know. I would favor that but I have no direct evidence for that.

Tr. 107-09 (emphasis added). As the emphasized portion illustrates, Dr. Bellanti could not connect the hepatitis B vaccine to his belief that an imbalance in T-regulatory cells causes autoimmune hepatitis.

Later testimony did not link the observation in the Longhi article that people with autoimmune hepatitis have an imbalance in their T-regulatory cells with the hepatitis B vaccine. T-regulatory cells were discussed in the context of a particular petitioner, Ms. Rotoli, who did not respond to the hepatitis B vaccine. See, e.g., tr. 620. Yet, no testimony showed how the hepatitis B vaccine connects to an imbalance in T-regulatory cells.

Even after the hearing resumed following a six month suspension, petitioners did not elicit testimony offering, in any sense, a basis for linking the hepatitis B vaccine with a problem in T-regulatory cells. Dr. Zweiman pointed out that the Longhi article studied people who had autoimmune hepatitis, not people who received the hepatitis B vaccine. Tr. 1100, 1130-32. Dr. Zweiman described the limits of medical knowledge. He stated that "nobody has ever reported whether or not hepatitis immunization induces alteration of immunoregulatory T-cells." Tr. 1132. Dr. Bellanti did not contradict Dr. Zweiman's statement, which seems to be in accord with Dr. Bellanti's testimony quoted at length above.

Petitioner's cause of action is that the hepatitis B vaccine caused autoimmune hepatitis. Dr. Bellanti's statements about the role of the T-regulatory cells are not relevant because no evidence connected a problem with T-regulatory cells to the hepatitis B vaccine. Therefore, statements about T-regulatory cells do not qualify as "a medical theory causally connecting the vaccination and the injury." Althen, 418 F.3d at 1278.

5. Other Arguments in Favor of a Causal Relationship Between the Hepatitis B vaccine and Autoimmune Hepatitis

Dr. Bellanti makes two other observations that he says support a causal relationship, although these observations are not directly tied to any of the four theories discussed above. One is an argument that because the hepatitis B virus can cause autoimmune hepatitis, the vaccine is presumed to be capable of causing the same disease. Another is the argument based on challenge

- rechallenge. Neither observation supports a finding that the hepatitis B vaccine can cause autoimmune hepatitis.

a. Is the hepatitis B vaccine analogous to the hepatitis B virus in causing autoimmune hepatitis?

Dr. Bellanti wrote in his report that because the hepatitis B virus causes autoimmune disease, "it should be assumed that the vaccine [for that virus] can also lead to autoimmunity." Exhibit 30 at 3. Even Dr. Bellanti's choice of words are problematic in that he states that "it should be assumed" that the vaccine is similar to the virus in that it can cause autoimmunity. To "assume" means to take something for granted or without proof. Assumptions are not evidence in vaccine cases.

In his testimony, Dr. Bellanti refined his position to some extent. Tr. 34, 93, 200. There are two problems with Dr. Bellanti's argument. One is the proposition that the hepatitis B virus causes autoimmune hepatitis. The other is whether the hepatitis B vaccine is analogous to the hepatitis B virus.

(1) Does the Hepatitis B Virus Cause Autoimmune Hepatitis?

A preponderance of the evidence establishes that the hepatitis B virus does not cause autoimmune hepatitis. Therefore, Dr. Bellanti errs when he states that "infection with the hepatitis B virus is known to cause autoimmune hepatitis." Exhibit 30 at 3.

Dr. Bellanti offers only a scintilla of support for his statement. Significantly, in his report, Dr. Bellanti did not identify any sources. This omission seems inconsistent with a fact that Dr. Bellanti asserts "is known."

In his testimony on the first day of hearing, Dr. Bellanti introduced a textbook to support his statement. Dr. Bellanti cites the third edition of a textbook, The Autoimmune Diseases, edited by Noel Rose and Ian Mackay. Tr. 78-83. This textbook appears to support Dr. Bellanti's assertion. Exhibit 55 (Michael P. Manns et al., Chapter 26: Autoimmune Diseases: The Liver, in The Autoimmune Diseases (Noel R. Rose and Ian R. Mackay, eds., 3d ed. 1998)) at 518.[5]

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[5] Dr. Zweiman criticizes Dr. Bellanti for using the third edition of the Rose and Mackay textbook. Dr. Zweiman observes that a chapter on "Chronic Hepatitis" from the fourth edition of this textbook does not mention the hepatitis B virus causing autoimmune hepatitis. Tr. 144.

This criticism is off-base for two reasons. First, this chapter uses the phrase "hepatitis viruses." Although Dr. Zweiman is correct in saying that the hepatitis B virus is not specifically mentioned, the more general term "hepatitis viruses" includes the hepatitis B virus. Second, to the extent that Dr. Zweiman is implying that the third edition of the Rose and Mackay textbook is out-of-date and that the fourth edition eliminates any mention of the hepatitis B virus, respondent

However, further examination indicates that the textbook's statement was in error. The textbook itself cites two articles. One from 1989 written by Laskus and Slusarczky. (The transcript of the hearing mistakenly shows the first author as "Velascquez.") The other was from 1984, and was written in German by Hopf and Möller.

Current medical knowledge strongly suggests that current doctors would not accept the diagnoses of autoimmune hepatitis from these case reports, which are more than 15 years old. The patient in the German study actually had chronic hepatitis B, not autoimmune hepatitis. Tr. 458-59, 854 (Dr. Koff's testimony). Similarly, the subject of the article by Laskus probably had hepatitis C, not autoimmune hepatitis. Tr. 460, 854.

After learning Dr. Koff's views about the Laskus and Hopf articles, Dr. Bellanti performed more research. He discovered two other articles that, initially, seem to offer some modest support for his assertion that "infection with the hepatitis B virus is known to cause autoimmune hepatitis." (Why these articles were not cited in Dr. Bellanti's initial report was not explained adequately.) However, neither article is persuasive.

In one article, an exacerbation of autoimmune hepatitis was associated with an administration of the Twinrix vaccine. Exhibit 62 (Antal Csepregi et al., Acute Exacerbation of Autoimmune Hepatitis Induced by Twinrix, 11 World J. Gastroenterol., 4114-4116 (2005)). Twinrix contains a vaccine against hepatitis A and a vaccine against hepatitis B. Tr. 1035, 1121. Although the presence of another vaccine confounds the analysis, the case report is weak evidence for another reason.

The problem with the Csepregi article is that it is a report about one case. As such, ruling out a possible coincidence is impossible. Case reports have little reliability in establishing causation. See, e.g., McClain v. Metabolife Intern., Inc., 401 F.3d 1233, 1253 (11th Cir. 2005); Meister v. Medical Engineering Corp., 267 F.3d 1123, 1129 (D.C. Cir. 2001); Glastetter v. Novartis Pharmaceuticals Corp., 252 F.3d 986, 989-90 (8th Cir. 2001). The symptoms of autoimmune hepatitis worsen episodically. Exhibit 30, Tab A (Krawitt) at 56; tr. 1145 (Dr. Koff's testimony). A worsening of symptoms may have occurred in the patient reported by Csepregi around the same time after he received the Twinrix. The Twinrix may have not caused the exacerbation of the autoimmune hepatitis. Tr. 1120-23 (Dr. Zweiman testimony); 1145-46, 1149 (Dr. Koff's testimony).

The final article that Dr. Bellanti presented to demonstrate that "infection with the hepatitis B virus is known to cause autoimmune hepatitis," concerns a child from Senegal. Doctors discovered that this child had both a chronic hepatitis B infection and autoimmune hepatitis. Exhibit 68 (Valerio Nobili et al., Co-occurrence of Chronic Hepatitis B Virus Infection and Autoimmune Hepatitis in a Young Senegalese Girl, 18 Eur. J. Gastroenterol Hepatol., 927-

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should have submitted the corresponding chapter, chapter 26, from the fourth edition. The same chapters from different editions create an apples-to-apples comparison.

929 (2006)). This article, however, provides no information about which condition came first. Therefore, it is speculative to assume that the hepatitis B infection caused the autoimmune hepatitis. The patient may have had autoimmune hepatitis before being infected with the hepatitis B virus. Tr. 1116-20 (Dr. Zweiman's testimony); 1144-45, 1147-48 (Dr. Koff's testimony).

Therefore, at best, Dr. Bellanti identified four articles that minimally support the proposition that the hepatitis B virus can cause autoimmune hepatitis. However, two articles were from the 1980's and, probably, do not represent current medical analysis. The two articles from this decade (Csepregi and Nobili) do not contain any meaningful analysis about causation. Thus, the persuasiveness of these articles is lacking.

Although the articles presented by Dr. Bellanti offer some minimal support for his assertion that "infection with the hepatitis B virus is known to cause autoimmune hepatitis," other evidence contradicts the assertion. The strongest contrary evidence is the scholarly article by Dr. Edward Krawitt, who is generally considered among the world's leading researchers in autoimmune hepatitis. Tr. 813. He wrote a review for the New England Journal of Medicine that all the experts cited. In this article, Dr. Krawitt states that autoimmune hepatitis has been associated with hepatitis A infection and hepatitis C infection. Exhibit 30, tab A, at 54. However, Dr. Krawitt omits the hepatitis B virus. Id.; see also tr. 75-76.

Omitting the hepatitis B virus from the viruses considered as possible triggers for autoimmune hepatitis was intentional. (Hepatitis A, hepatitis B, and hepatitis C are three completely different viruses. Tr. 59, 473-74.) Dr. Koff recounted that between sessions of hearings in these cases, he spoke to Dr. Krawitt and two other experts in autoimmune hepatitis. All three experts told Dr. Koff that they were not aware of the hepatitis B virus causing autoimmune hepatitis. Tr. 989-92. Their statements match Dr. Koff's own statements during the first session of the hearing. Tr. 437. Collectively, this evidence is very persuasive.

Thus, a preponderance of the direct evidence regarding the hepatitis B virus contradicts an assertion that it can cause autoimmune hepatitis. Although Dr. Bellanti can state with a fair degree of support that viruses in general are thought to cause autoimmune diseases in general, this general proposition does not make up for the lack of more specific evidence linking the hepatitis B virus to autoimmune hepatitis.

(2) Is the Hepatitis B Vaccine Analogous to the Hepatitis B Virus?

Even assuming that the hepatitis B virus causes autoimmune hepatitis, Dr. Bellanti's reasoning that "it should be assumed" that the vaccine can cause the same result is questionable. Differences between the hepatitis B vaccine and hepatitis B virus require more analysis than an assumption.

The Institute of Medicine offers some general support for Dr. Bellanti's reasoning. The IOM has stated that "the vaccine-adverse event association should be plausible and coherent with current knowledge about the biology of the vaccine and the adverse event. Such information includes experience with the naturally occurring infection against which the vaccine is given, particularly if the vaccine is a live attenuated virus." Exhibit 77 (Vaccine Safety Committee, Institute of Medicine, Adverse Events Associated with Childhood Vaccines: Evidence Bearing on Causality (Kathleen R. Stratton et al. eds. 1994)) at 22.

However, extending this proposition to vaccines, such as the hepatitis B vaccine, that do not contain a "live attenuated virus," is uncertain. Tr. 1127-28 (Dr. Zweiman testimony). The hepatitis B vaccine does not replicate in the body. Tr. 85-86 (Dr. Bellanti's testimony).

Dr. Bellanti maintains that non-replicating vaccines and vaccines that contain live viruses, which replicate in the body, prompt a similar immune response that can, in rare cases, include an adverse consequence. Tr. 34, 63-64.

During Dr. Bellanti's testimony, he recognized how a vaccine containing a live virus interacts with a person's immune system differs from how a vaccine containing inert material interacts. He was forced to backtrack and to revise his statement to the more general proposition that a person's immune system follows the same steps in responding to a foreign invader regardless of whether the invader is a live virus or a non-replicating protein. Tr. 200, 372, 1128, 1593. This revised statement is accurate. However, its generality provides no information to connect the hepatitis B vaccine and autoimmune hepatitis.

Whether a preponderance of the evidence supports Dr. Bellanti's reasoning is unnecessary to decide. Whether the hepatitis B vaccine is comparable to the hepatitis B virus is relevant in this case only to the extent that the hepatitis B virus is capable of causing autoimmune hepatitis. The preceding section explains that a preponderance of the evidence contradicts this assertion. Therefore, Dr. Bellanti's belief about the hepatitis B virus does not help establish a reliable medical theory.

b. Challenge - Rechallenge

A second assertion made by Dr. Bellanti to support his overall theory that the hepatitis B vaccine can cause autoimmune hepatitis is that "[t]here are reports in the literature of positive rechallenge where [the hepatitis B vaccine] has been reported to cause various autoimmune conditions." Exhibit 30 at 4.

"A rechallenge event occurs when a patient who had an adverse reaction to a vaccine suffers worsened symptoms after an additional injection of the vaccine." Capizzano v. Sec'y of Health & Human Servs., 440 F.3d 1317, 1322 (Fed. Cir. 2006). Rechallenge can be persuasive evidence that a vaccine is causing an adverse reaction. Tr. 35-36.

Whether literature actually includes cases of rechallenge with the hepatitis B vaccine is not clear. In his report, Dr. Bellanti did not cite any literature for this proposition. Likewise, Dr. Bellanti did not discuss literature about rechallenge in his testimony. See tr. 55-69 (discussing articles). Considering that Dr. Bellanti's report refers to "reports in the literature," his silence on this topic is somewhat surprising (and telling).

Once again, Dr. Bellanti failed to meet the expectations that he himself set. On cross-examination, Dr. Bellanti was asked about rechallenge. Tr. 102-3.

Because the Court's May 31, 2007 order raised this issue specifically, Dr. Bellanti should have expected the question. However, Dr. Bellanti did not know the answer and stated that he needed to review what he submitted. Tr. 103. This evasive answer decreased Dr. Bellanti's credibility.

Furthermore, Dr. Bellanti was questioned about the Beran article. In this study, people with autoimmune hepatitis were given the hepatitis B vaccination. The subjects tolerated exposure to the hepatitis B vaccine without worsening the underlying autoimmune hepatitis. Tr. 199-203, exhibit 1004 (J. Beran, Safety and Immunogenecity of a Combined Vaccine Against Hepatitis A and B in Patients with Autoimmune Hepatitis, 13 Cent Eur J Pub Health, 20-3 (2005)). This article, therefore, is evidence contrary to Dr. Bellanti's unsubstantiated assertion.[6]

6. Summary regarding Medical Theory

Ms. Torbett bears the burden of proposing "a medical theory causally connecting the vaccination and the injury." Althen, 418 F.3d at 1278. A theory is not required to be established to a level of medical certainty and does not need to describe the precise biological mechanism. Nevertheless, the theory must have some minimal level of reliability. Knudsen, 35 F.3d at 548; Bunting, 931 F.2d at 873.

Here, through Dr. Bellanti, Mr Torbett offers four medical theories. None of these theories satisfy Ms. Torbett's burden of proof. Dr. Bellanti withdrew the molecular mimicry theory primarily because no evidence shows a homology between parts of the hepatitis B vaccine and liver cells that are attacked by autoimmune hepatitis. The Institute of Medicine has rejected two other theories, bystander activation and polyclonal activation. Dr. Bellanti did almost nothing to justify these two theories, which are theories that, by his own admission, he does not favor, nor did he rebut the Institute of Medicine's investigation and conclusion. The fourth theory, T-regulatory deficiency, is not really a theory in the sense that it does not involve the hepatitis B vaccine.

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[6] Requesting Dr. Bellanti to substantiate his statement does not violate Althen's statement that experts are not required to produce literature. It was Dr. Bellanti who stated "[t]here are reports in the literature of positive rechallenge." Dr. Bellanti's inability to prove what he wrote implicates his persuasiveness and his veracity.

In addition, Dr. Bellanti offered two other points that, arguably, could support an argument that the hepatitis B vaccine can cause autoimmune hepatitis. However, these too were not persuasive. A preponderance of the evidence shows that the hepatitis B virus has not been shown to cause autoimmune hepatitis. Also, the evidence in this case does not establish examples of positive rechallenge with the hepatitis B vaccine.

For all these reasons, Ms. Torbett has failed to meet her burden of establishing, by a preponderance of the evidence, a medical theory connecting the hepatitis B vaccine to autoimmune hepatitis.

B. Timing

Dr. Bellanti's testimony about the temporal relationship is not persuasive. His written report states that "[t]he temporal relationship between her immunizations and the onset of symptoms is medically appropriate...." Exhibit 30 at 6. However, the report does not date the onset of Ms. Torbett's symptoms. During cross-examination, Dr. Bellanti stated the first symptom of autoimmune hepatitis is in April 1996, when Ms. Torbett reported that she was having stiffness in her joints. Tr. 1238; exhibit 13 ¶ 3. Dr. Bellanti believes that joint stiffness can be the first manifestation of autoimmune hepatitis. Tr. 1251.

This assertion is not persuasive for three reasons. First, no medical record created around April 1996, documents that Ms. Torbett was experiencing stiffness in her joints. A reasonable inference from the lack of a medical record created contemporaneously with the event being described is that the event did not occur as set forth later. Cucuras v. Sec'y of Health & Human Servs., 993 F.2d 1525, 1528 (Fed. Cir. 1993). Although Ms. Torbett could have requested a hearing to present her own testimony, she did not. Second, even assuming that Ms. Torbett did have stiffness in her joints, this symptom does not determine that she has autoimmune hepatitis. Joint stiffness can be caused by many diseases, not just autoimmune hepatitis. Tr. 1506-07. Given Dr. Bellanti's lack of expertise with autoimmune hepatitis, his opinion that Ms. Torbett's joint stiffness in April 1996 was a symptom of autoimmune hepatitis is not persuasive. Third, even if Ms. Torbett's April 1996 joint stiffness were part of her autoimmune hepatitis, Ms. Torbett has not established, by a preponderance of the evidence, that this symptom began within the appropriate temporal window.

Dr. Bellanti continues by placing other known facts about Ms. Torbett's condition into a time line. He states that the first sign of autoimmune hepatitis was on December 2, 1996, when Ms. Torbett visited a doctor because she was having pain in her arm. Tr. 1239. (The difference between a symptom and a sign is that a symptom is something that the patient experiences and a sign is something that a doctor observes.) The next sign of autoimmune hepatitis, according to Dr. Bellanti, is another occurrence of joint pain on June 27, 1997. Tr. 1241; exhibit 1 at 35. Tests on blood drawn on August 30, 1997, revealed that Ms. Torbett had abnormal liver enzymes. Tr. 1247, exhibit 1 at 49.

It is more likely than not that Dr. Bellanti is wrong about the significance of Ms. Torbett's joint pain in December 1996. Dr. Bellanti errs in attributing the joint pain to autoimmune hepatitis. The more likely cause of Ms. Torbett's joint pain was Ms. Torbett's employment as a teacher of physical education. See tr. 1445 (testimony of Dr. Koff), 1499 (testimony of Dr. Zweiman). Her medical records indicate that she had joint problems, such as tennis elbow. This type of joint problem is caused by overuse, not as a reaction to an antigen. Tr. 1445-46 (testimony of Dr. Koff), 1548-50 (testimony of Dr. Zweiman). Although autoimmune hepatitis can be manifested outside of the liver, including pain in the joint, tennis elbow is not an extrahepatic manifestation of autoimmune hepatitis. Tr. 1435 (testimony of Dr. Koff).

Dr. Bellanti recognized that if Ms. Torbett's joint pain in 1996 were considered not to be a manifestation of autoimmune hepatitis, then his opinion would be difficult to maintain. Dr. Bellanti could not maintain his opinion that the hepatitis B vaccine caused Ms. Torbett's autoimmune hepatitis because the onset of the autoimmune hepatitis occurred too long after the hepatitis B vaccinations. Tr. 1261-62.

The earliest indications that Ms. Torbett's liver was not functioning normally were the results of testing on blood drawn on August 30, 1997. Tr. 1446 (Dr. Koff's testimony); exhibit 1 at 49; see also exhibit 4 at 28. However, these abnormal results did not lead the doctors to start a thorough explanation for why the results were not normal. See exhibit 1 at 58 (visit on December 19, 1997, for follow up on blood work results).

Even if the August 30, 1997 abnormal results are assumed to be a sign of autoimmune hepatitis for sake of argument, the timing does not help Ms. Torbett. The third and final dose of the hepatitis B vaccine was given to Ms. Torbett on August 20, 1996. Exhibit 12 at 1. This chronology means that approximately one year passed between her receipt of the hepatitis B vaccine and the onset of autoimmune hepatitis. This much time does not fit Dr. Bellanti's opinion about the expected temporal relationship. See tr. 34 (Dr. Bellanti's general opinion about appropriate timing is 14-40 days).

Consequently, Ms. Torbett has failed to meet her burden of establishing, by a preponderance of the evidence, the third factor identified by Althen. She has not shown an appropriate temporal relationship.

C. Logical Sequence of Cause and Effect

After a finding that Ms. Torbett has not met two of the Althen factors, little analysis of the remaining Althen factor is needed. Because Ms. Torbett has established neither a reliable medical theory nor an appropriate temporal relationship by a preponderance of the evidence, whether she also has established a logical sequence of events connecting the vaccination to the onset of her autoimmune hepatitis does not affect the outcome of Ms. Torbett's case. Nevertheless, for sake of completeness, this element is also addressed.

Ms. Torbett has not established, by a preponderance of the evidence, a logical sequence of events connecting any hepatitis B vaccine to her autoimmune hepatitis. Initially, it should be noted that without a reliable theory and without an appropriate temporal relationship, a petitioner probably cannot establish "a logical sequence of events." Setting aside this academic point, the evidence in Ms. Torbett's case fails to show the logical sequence of events.

In regard to proving the second prong of Althen, the testimony of treating doctors should be considered. 42 U.S.C. § 300aa-13; Capizzano v. Sec'y of Health & Human Servs., 440 F.3d 1317, 1326 (Fed. Cir. 2006). However, opinions from these sources are not dispositive. 42 U.S.C. § 300aa-13(b).

In the collection of medical records, there appears to be only one treating physician who commented, either positively or negatively, about whether the hepatitis B vaccine caused Ms. Torbett's autoimmune hepatitis. This physician was Dr. Grainger, the person who treated Ms. Torbett for her joint problems, among other conditions.

Although the notation is not well-developed, it appears that Ms. Torbett requested that Dr. Grainger provide a statement that the hepatitis B vaccine caused her autoimmune problems. Dr. Grainger, however, indicated that he could not make this statement. Exhibit 1 at 1433; see also tr. 1557-58 (testimony of Dr. Bellanti, discussing this note).

Standing by itself, this handwritten set of notes on a telephone message pad is relatively weak evidence. It could have been overcome by more persuasive evidence that the hepatitis B vaccine did cause Ms. Torbett's autoimmune hepatitis. However, there is no persuasive evidence establishing this causal connection. Therefore, Dr. Grainger's statement constitutes just one more piece of evidence in line with the other evidence that indicates that Ms. Torbett has not established, by a preponderance of the evidence, a logical sequence of cause and effect linking the hepatitis B vaccine to her autoimmune hepatitis.

Sections A, B, and C, above, explain that Ms. Torbett has not established, by a preponderance of the evidence, her burden of proving any of the factors required by Althen. Thus, she is not entitled to compensation. Although the analysis may end at this point, it continues to address an alternative argument raised by respondent.

D. Alternative Causes

Ms. Torbett has failed to establish that she is entitled to compensation because she has not met the elements under Althen. For sake of completeness, one additional issue remains to be discussed. Respondent states that something other than the hepatitis B vaccine caused Ms. Torbett's autoimmune hepatitis, namely, the drug minocycline. Dr. Koff believes that the minocycline caused Ms. Torbett's autoimmune hepatitis. Tr. 1441. A preponderance of the evidence establishes that it is more likely than not that the minocycline caused Ms. Torbett's autoimmune hepatitis.

Minocycline is a drug prescribed to treat acne. A dermatologist prescribed minocycline for Ms. Torbett in July 1996. Exhibit 5 at 6. A doctor suggested that Ms. Torbett discontinue using minocycline for about two weeks in October 1998. Exhibit 4 at 27. Thereafter, Ms. Torbett continued to take minocycline until February 1999, when a doctor discontinued it because the doctor thought it might be causing the autoimmune hepatitis. Exhibit 5 at 7.

Minocycline is known to induce hepatitis. Dr. Koff presented seven articles to support his statement that minocycline can induce hepatitis.

The hepatitis caused by minocycline is not distinguishable from the hepatitis caused by an autoimmune reaction. Exhibit C, tab 5 (NS Goldstein, et al. Minocycline as a cause of drug-induced autoimmune hepatitis: report of four cases and comparison with autoimmune hepatitis, 114 Am J Clin Pathol 591 (2000)). In the authoritative article on autoimmune hepatitis, Dr. Krawitt states that autoimmune hepatitis should not be given as a diagnosis until after the physicians has excluded other causes of hepatitis. Dr. Krawitt lists several possible other causes including minocycline. Exhibit C, tab A (Edward L. Krawitt, M.D., Autoimmune Hepatitis N Engl J Med 2006; 354:54-66). Thus, the causal connection between minocycline and hepatitis is well-established and reliable.

Dr. Bellanti said, in the context of Ms. Torbett's case, very little about minocycline. He did not discuss minocycline at all during his direct testimony. Tr. 1223-32. At best, he made the conclusory statement that other causes for autoimmune hepatitis were ruled out. Tr. 1229. However, Dr. Bellanti's demeanor when he was testifying strongly suggested that he was uncomfortable making this broad statement. During cross-examination, Dr. Bellanti was asked questions about Ms. Torbett's use of minocycline, but was not asked to explain why he believed that the minocycline did not cause the autoimmune hepatitis. See tr. 1234, 1244-47. In rebuttal testimony, Dr. Bellanti acknowledged that minocycline can cause an immune-mediated reaction. Tr. 1552-57. Yet, again, there is absence of testimony from Dr. Bellanti to refute Dr. Koff's opinion that minocycline caused the autoimmune hepatitis.

Ms. Torbett's hepatitis also probably developed within a time that was medically appropriate. Reports have shown that hepatitis has developed up to 12 years after minocycline was started. Exhibit F, Tab 5 at 596-7 (Goldstein, Neal S., MD, Bayati, Nasser, MD, Silverman, Ann L., MD, Gordon, Stuart C., MD. Minocycline as a Cause of Drug-Induced Autoimmune Hepatitis. Am J Clin Pathol 2000;114:591-598).

As discussed previously, the onset of Ms. Torbett's autoimmune hepatitis appears to be August 1997, when blood tests showed abnormal liver functions. This date is approximately 13 months after Ms. Torbett began taking minocycline. The literature indicates that the median amount of time from the beginning of minocycline use to the onset of autoimmune hepatitis is 2 years. Exhibit F, Tab 5 at 596-7 (Goldstein, Neal S., MD, Bayati, Nasser, MD, Silverman, Ann L., MD, Gordon, Stuart C., MD. Minocycline as a Cause of Drug-Induced Autoimmune Hepatitis. Am J Clin Pathol 2000;114:591-598).

Finally, one of Ms. Torbett's treating doctors discontinued her prescription of minocycline after Ms. Torbett reported that she had hepatitis. Exhibit 5 at 7. This action is consistent with a belief that the minocycline could be causing Ms. Torbett's liver troubles.

In sum, a preponderance of the evidence supports a finding that minocycline caused Ms. Torbett's hepatitis.[7] The medical theory connecting minocycline to autoimmune hepatitis is reliable and supported by several articles. The temporal window is appropriate. Dr. Koff's testimony also established the logical sequence of cause and effect between the minocycline and the hepatitis. Tr. 1454-55.

E. Conclusion

Ms. Torbett has failed to established any of the factors established in Althen. For this reason, she is not entitled to compensation. Separately and additionally, a preponderance of the evidence indicates that minocycline was more likely to have caused Ms. Torbett's hepatitis.

V. Additional Comments Regarding Dr. Bellanti

Sections I-IV above of this decision resolve Ms. Torbett's case based upon an analysis of the complete record in this case. The complete record includes two different types of evidence — evidence that is generic to the four other cases alleging that the hepatitis B vaccine caused autoimmune hepatitis and evidence that is specific to an individual's case, here Ms. Torbett. Some portions of this record, such as Dr. Bellanti's testimony that the hepatitis B vaccine can cause autoimmune hepatitis, are the same as the record in other cases. Consequently, the analysis in section IV.A. of this particular case duplicates the analysis in other cases. The analysis of evidence regarding this particular petitioner is set forth in sections IV.B. through IV.D., above.

Dr. Bellanti's opinion is not persuasive in this case. It also was not persuasive in any of the cases in which petitioners alleged that the hepatitis B vaccine caused autoimmune hepatitis. In every case, his opinion suffered from two significant flaws. First, Dr. Bellanti's written report did not match his oral testimony (section A, below). Second, in terms of addressing autoimmune hepatitis, Dr. Bellanti possessed little knowledge (section B, below). These two points probably contributed to Dr. Bellanti's demeanor, which is discussed in section C, below.

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[7] Given this finding, it is not necessary to address respondent's second proposed alternative cause, another drug that Ms. Torbett was prescribed named diclofenac. A few case reports associate diclofenac with the onset of autoimmune hepatitis. Dr. Koff opined that minocycline was much, much more likely to have caused the autoimmune hepatitis than diclofenac and, in turn, diclofenac was much more likely to have caused the autoimmune hepatitis than the hepatitis B vaccine. Tr. 1455, 1483, 1491.

A. Dr. Bellanti's Testimony Failed To Match His Report

Taken on its face, Dr. Bellanti's report indicates that the hepatitis B vaccine can cause – and for these petitioners did cause – autoimmune hepatitis. However, Dr. Bellanti's own testimony does not support what was written in Dr. Bellanti's report. The dichotomy between the words written in Dr. Bellanti's report and words spoken by Dr. Bellanti impairs Dr. Bellanti's credibility. The point, which is repeated several times below, is that Dr. Bellanti could not substantiate the information that was in his own report.

The following six sections provide examples of when Dr. Bellanti's testimony did not match his report. If any one of the topics discussed below were the only time there was a disconnect between Dr. Bellanti's written report and Dr. Bellanti's testimony, perhaps, any discrepancy could be excused as an isolated, innocent error. However, as set forth below, Dr. Bellanti's report contains more than one discrepancy with his oral testimony. The number of places in which Dr. Bellanti's report does not match his testimony amounts to a pattern, suggesting a more significant problem with Dr. Bellanti's credibility.

1. Hepatitis B Virus "Is Known To Cause" Autoimmune Hepatitis

Dr. Bellanti's first point is that an "infection with hepatitis B virus is known to cause autoimmune hepatitis." Exhibit 30 at 2. Although Dr. Bellanti states this fact "is known," a preponderance of the evidence indicates that Dr. Bellanti's statement was in error. See section IV.A.5.a., above.

It is curious that in his report, Dr. Bellanti wrote that "infection with hepatitis B virus is known to cause autoimmune hepatitis." Exhibit 30 at 2 (Emphasis added). In describing what the medical community "knows," Dr. Bellanti was implying that there is a general agreement on this point. But, there is no general agreement that the medical community "knows" that the hepatitis B virus causes autoimmune hepatitis.

Dr. Bellanti provided absolutely no basis for this assertion in his report. A more accurate statement is that "four articles associate the hepatitis B virus with the onset (or exacerbation) of autoimmune hepatitis." These four articles, consisting of a single case report each, cannot support the statement that "infection with hepatitis B virus is known to cause autoimmune hepatitis."

Moreover, whether Dr. Bellanti can substantiate his assertion about what "is known" about the relationship between hepatitis B vaccine and autoimmune hepatitis is a question about Dr. Bellanti's veracity. When his written report states that something "is known," Dr. Bellanti should be able to demonstrate the accuracy of his own statement. His failure to prove his assertion with any persuasive evidence suggests that Dr. Bellanti wrote his report without substantiation for his statements at all.

The sequence of events about efforts to establish the basis for Dr. Bellanti's own report at least opens the way for an argument that Dr. Bellanti's report was not written in good faith. Dr. Bellanti's report did not have any citations for his assertion. His only support on the first day of the hearing was the third edition of the Rose and Mackay textbook. Normally, a textbook would be a reliable basis for a statement. However, the Rose and Mackay textbook relied upon two articles that were out-of-date (at least 15 years old). In addition, the Krawitt article, which all experts found to be informative about autoimmune hepatitis, contradicts the Rose and Mackay textbook. After the accuracy of the textbook was called into question, Dr. Bellanti searched for additional literature. But, the articles he presented (by Csepregi and Nobili) were not persuasive. Collectively, all the literature cited by Dr. Bellanti falls well short of establishing that the medical community "knows" the hepatitis B virus causes autoimmune hepatitis.

2. Hepatitis B Vaccine, Autoimmune Disease and Rechallenge

Dr. Bellanti's report also introduced a concept – rechallenge – that he failed to prove. See section IV.A.5.b., above.

The misleading nature of Dr. Bellanti's report comes from his failure to substantiate his own assertions. Dr. Bellanti was specifically ordered to be prepared to discuss the rechallenge point because, according to respondent's expert, Dr. Zweiman, none of the articles submitted by Dr. Bellanti supported his report. Order, filed May 31, 2007.

However, when Dr. Bellanti testified, he did not discuss any literature as showing examples of rechallenge. See tr. 55-69 (discussing articles). Considering that Dr. Bellanti's report refers to "reports in the literature," his silence on this topic raises questions about the accuracy of his report.

Besides not discussing examples of rechallenge generally, Dr. Bellanti could not identify any article that shows a rechallenge pattern for autoimmune hepatitis specifically. Tr. 102-03. Because the Court's May 31, 2007 order raised this issue specifically, Dr. Bellanti should have been prepared to answer questions about rechallenge. However, Dr. Bellanti could not answer questions regarding rechallenge and he stated that he needed to review what he submitted. Tr. 103. This evasive answer decreased Dr. Bellanti's credibility and calls into question the truthfulness of Dr. Bellanti's report. If Dr. Bellanti were aware of articles showing that a pattern of challenge and rechallenge links the hepatitis B vaccine and autoimmune hepatitis, Dr. Bellanti would have identified them. (This expectation is reasonable because Dr. Bellanti's report states that "there are reports in the literature. . ." and it was the subject of the May 31, 2007 order.) The failure of Dr. Bellanti to identify any articles strongly suggests that there are none. See tr. 129 (testimony of Dr. Zweiman saying he could not find any articles).

By writing about rechallenge, Dr. Bellanti created an expectation that further evidence on this topic will assist his theory. However, there was little testimony about this topic and what testimony that was elicited from Dr. Bellanti on this point contradicted the argument in his

written report. Thus, a question arises as to why Dr. Bellanti introduced rechallenge in his report in the first place.

3. Other Components in the Hepatitis B Vaccine

Dr. Bellanti's report also contains an introductory point that the hepatitis B vaccine contains other components "such as yeast, aluminum and thimerosal." Exhibit 30 at 2. Dr. Bellanti expands on this point by citing articles by Gherardi (Tab B), Grotto (Tab C), and Geier (Tab D) as instances in which authors considered a causal role for these parts of the hepatitis B vaccine.

Once again, Dr. Bellanti's report promised, at least implicitly, more than Dr. Bellanti delivered. During his testimony, Dr. Bellanti explained that yeast, aluminum and thimerosal could prompt a hypersensitivity reaction. But, when questioned by the Court, Dr. Bellanti stated that a hypersensitivity reaction would not lead to autoimmune hepatitis. Consequently, Dr. Bellanti "wouldn't put too much credit[] on that theory." Tr. 98; accord tr. 609 (Dr. Bellanti's testimony stating that the aluminum, thimerosal and yeast are not "big contributors here.") If Dr. Bellanti discounts the role of the other components of the hepatitis B vaccine, then the question becomes why did Dr. Bellanti include this statement in his report.

Again the problem is that Dr. Bellanti, himself, expressed doubt about his own theory. It is not a situation in which experts disagreed and one expert was found to be more persuasive than the other. Here, Dr. Bellanti conceded the lack of probative force of his own theory on his own. (Although not necessary for discounting the theory that yeast, aluminum or thimerosal caused an adverse reaction, Dr. Zweiman presented testimony with supporting articles that indicated that these substances have not been found to cause adverse reactions. Tr. 126-28, citing Exhibit 1007 (Lauren D. DiMiceli et al., Vaccination of Yeast Sensitive Individuals: Review of Safety Data in the US Vaccine Adverse Event Reporting System (VAERS), 24 Vaccine 703 (2006)). If Dr. Bellanti believes that these other components are not "big contributors" in these cases, then Dr. Bellanti should not have included them in his report. Their inclusion wrongly implies that they are relevant.

4. Potential Theories That Vaccines Can Cause Autoimmune Disease

Dr. Bellanti's report lists four theories by which vaccines can cause autoimmune disease. These four theories were analyzed and rejected in section IV.A., above.

Repeating the reasons for rejecting the four theories is not necessary. But, in the context of discussing Dr. Bellanti's credibility, a few points warrant further review. First, Dr. Bellanti promoted molecular mimicry as the more likely theory. Tr. 90, 201. Yet, when questioned about the specifics of molecular mimicry, Dr. Bellanti retreated. Tr. 86-87 (Dr. Bellanti's testimony that no homology has been found); 203 (Dr. Bellanti's testimony that molecular mimicry does not explain his alleged connection between the hepatitis B vaccine and autoimmune hepatitis).

The withdrawal of this theory suggests that Dr. Bellanti failed, when writing his report, to consider what molecular mimicry entails. Instead, the implication is that Dr. Bellanti listed theories without analyzing them in the context of a particular case.

Dr. Bellanti's report also lists, as a theory to explain how the hepatitis B vaccine can cause autoimmune hepatitis, the "participation of CD4+ regulatory cells." This topic is complicated and difficult for someone not trained in immunology to understand.

A theory about CD4+ regulatory cells possibly could have been developed to be persuasive, but Dr. Bellanti's oral presentation and written report on this topic were so vague that any potential connection to or substantiation for Dr. Bellanti's theories was lost. In this testimony, Dr. Bellanti cited Dr. Krawitt's article to support a statement that people with autoimmune hepatitis have a deficiency in CD4+ regulatory cells. Tr. 42-43. Dr. Krawitt, in turn, relies upon an article by Dr. Longhi.

In some respects, Dr. Longhi's article demonstrates that Dr. Bellanti appears not to have thought out his presentation. Dr. Bellanti did not cite Dr. Longhi's articles in his report and did not file a copy of it. However, the Longhi article was discussed much more than any article that Dr. Bellanti actually filed. After the potential importance of Dr. Longhi's article became clear at the beginning of the hearing, the Court obtained a copy of it and filed it as exhibit 1001. Dr. Bellanti would have appeared more prepared if he had cited and discussed this article in his report.

While potentially useful, the Longhi article does not enhance Dr. Bellanti's persuasiveness. The Longhi article has two problems. First, it does not explain whether the deficiency in CD4+ regulatory cells is the cause or the effect of autoimmune hepatitis. See tr. 1131 (testimony of Dr. Zweiman). Second, even if a deficiency in CD4+ regulatory cells were the cause of autoimmune hepatitis, no evidence or theory indicates that the hepatitis B vaccine is the cause of the deficiency in CD4+ regulatory cells.

If Dr. Bellanti's report were more explicit in his reasoning, the gaps in Dr. Bellanti's theory would have been more apparent. By describing CD4+ regulatory cells in general, Dr. Bellanti's report fails to use the CD4+ regulatory cells to connect the hepatitis B vaccine and autoimmune hepatitis.

5. Literature Attached To Dr. Bellanti's Report

Dr. Bellanti's report also attached eight articles. With one exception, these articles were not helpful. The only relevant article was Dr. Krawitt's article about autoimmune hepatitis. This article did present useful information about the disease.

The remaining articles provided almost no information that advanced Dr. Bellanti's opinion. The article by Gherardi et al. postulates that aluminum in the hepatitis B vaccine can

cause a condition called macrophage myofasciitis. Exhibit 59, tab B. But, as discussed above, Dr. Bellanti discounts the role of aluminum in causing autoimmune hepatitis. Tr. 98, 609.

The next article was written by Grotto et al. Dr. Bellanti cited this article to support his assertion that the appropriate amount of time for an adverse reaction to the hepatitis B vaccine is 20-40 days. Tr. 51. Grotto does support this proposition. But, the crucial problem here is that the evidence does not show that petitioners developed their autoimmune hepatitis within 40 days after receiving the hepatitis B vaccine. See section IV.B., above.

The fourth article was written by Geier et al. During Dr. Bellanti's testimony on direct examination, he stated that he "only relied on this secondarily . . . . I didn't put much credit on that one as I did on some of the others, but it's useful." Tr. 55. In Dr. Bellanti's own words, this article should not be given much weight. Dr. Zweiman agrees that the Geier article rests on a shaky foundation, the VAERS database. Tr. 144-46; accord Analla v. Sec'y of Health & Human Servs., 70 Fed. Cl. 552, 558 (2006) (citing cases and indicating "concerns about the reliability of VAERS data").

The fifth article was written by Lilic and Ghosh. This article reports a single case in which the hepatitis B vaccine was associated with transient liver dysfunction. This case report has little value because the liver dysfunction was not autoimmune hepatitis. Again, Dr. Bellanti recognized the limited utility of this article. Tr. 56-57.

The sixth article was written by Bogdanos. Dr. Bellanti cited this article for the proposition that the hepatitis B virus is associated with a range of autoimmune responses. Exhibit 30 at tab F; tr. 58. The article does support this general proposition, although the article is based upon a theory that the molecular structure of the hepatitis B virus (not vaccine) mimics the molecular structure of some parts of the body. But, the relevant question is more specific – does the hepatitis B virus cause autoimmune hepatitis, the condition for which petitioners seek compensation. The evidence on this point is scant, at best. See section 1, above. Therefore, this article – even accepting it at face value – does not advance Dr. Bellanti's theories.[8]

The seventh article, which was written by Porobic et al., does not contain any relevant information. This article suggests that the hepatitis B vaccine may induce anti-phospholipid antibodies. However, according to Dr. Bellanti's understanding, anti-phospholipid antibodies do not cause autoimmune hepatitis. Tr. 62-63. Thus, Dr. Bellanti confesses he "only used as a signal." Tr. 61.

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[8] Dr. Zweiman disputes the accuracy of the Bogdanos article. Tr. 177. However, this criticism is not relevant in commenting upon the disparity between Dr. Bellanti's written report and his oral testimony. Dr. Bellanti's written report suggests that the Bogdanos article is meaningful. His testimony indicates otherwise.

The eighth article provided a small amount of support to a theory of molecular mimicry. This theory is based upon a homology between the antigen (the hepatitis B vaccine) and a structure in the body (in this article, the myelin surrounding nerves). But, Dr. Bellanti could not support molecular mimicry for these cases because there does not appear to be any homology between the hepatitis B vaccine and liver tissue. Tr. 86-87, 203; see also tr. 133-36 (testimony of Dr. Zweiman discussing this article).

In sum, five of the articles that Dr. Bellanti presented were not helpful at all. (The only helpful article is by Krawitt on autoimmune hepatitis. To a much lesser degree, the articles by Grotto and Bogdanos weakly supported Dr. Bellanti's opinion.) Again, the point to be emphasized is that at hearing, Dr. Bellanti, himself, indicated that the five articles were not significant. For some articles, Dr. Bellanti discounts the article's relevance explicitly by saying that he used the article as a "signal" or "secondarily." For all the articles, except Krawitt's, the lack of contribution is implicit in the amount of time spent addressing the articles listed in Dr. Bellanti's report. On direct examination, Dr. Bellanti covered his literature in about 15 pages. Then, after the first day of testimony, the articles were not discussed again. By way of contrast, the article by Longhi was discussed repeatedly. The infrequency of testimony about the articles strongly suggests that they should not have been included with Dr. Bellanti's report in the first place.[9]

6. Discussion Of Temporal Relationship In Dr. Bellanti's Report

Dr. Bellanti's report concludes with a discussion of timing. In every case, the report states "The temporal relationship between [the petitioner's] immunizations and the onset of symptoms is medically appropriate." Exhibit 30 at 5. As discussed in detail in each case, Dr. Bellanti was shown to lack the knowledge to make any statements about the onset. His report, therefore, is misleading and not accurate.

Dr. Bellanti could not state when the petitioner experienced an "onset of symptoms." In Torbett, this problem is innate because the medical records do not show when the autoimmune hepatitis began. In Rotoli, the problem is that Dr. Bellanti did not understand the report from her liver biopsy, which showed fibrosis.

These problems with Dr. Bellanti's report became apparent only during the hearing. However, Dr. Bellanti (and, arguably, petitioner's counsel) should have realized the limits of his ability. Rereading his report in light of the testimony produces an impression that Dr. Bellanti's report omitted any discussion of when the petitioner's autoimmune hepatitis began to avoid this topic. However, this lack of forthrightness lessens Dr. Bellanti's credibility.

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[9] Articles from peer-reviewed journals are useful when they substantiate the reliability of an expert's opinion. Articles that do not support the expert's opinion are not relevant. Petitioners and Dr. Bellanti should not file irrelevant articles. Submitting irrelevant materials causes the parties and the court to waste time and resources when the articles are reviewed.

7. Summary: Dr. Bellanti's Report

The preceding six sections illustrate problems with Dr. Bellanti's report. These problems are problems because Dr. Bellanti's own testimony did not corroborate his report. Whether Dr. Bellanti had a reasonable basis for offering his report as originally written will be evaluated if petitioners seek attorneys' fees and costs.

B. Lack of Expertise With Autoimmune Hepatitis

The preceding section about Dr. Bellanti's report explains how Dr. Bellanti's oral testimony differed from his report for no apparent reason. The situation is different for Dr. Koff's report. This report provided reasons for Dr. Bellanti to re-evaluate his conclusion that the hepatitis B vaccine caused petitioner's autoimmune hepatitis. But, Dr. Bellanti seems to have ignored Dr. Koff's report and did not adjust his report when respondent presented him with new information.

To present a reliable, credible and persuasive opinion that the hepatitis B vaccine caused autoimmune hepatitis, Dr. Bellanti should have investigated autoimmune hepatitis much more thoroughly. Even if Dr. Bellanti did not adequately research the disease about which he was opining before he wrote his report, he certainly should have been more informed about the disease when he testified.

Although Dr. Bellanti specializes in the field of immunology, his lack of knowledge about diseases of the liver can be excused only in part. Dr. Koff's report alerted Dr. Bellanti to the salient issues. Dr. Koff also presented articles from peer-reviewed publications to support his opinion. Despite having information from articles cited by Dr. Koff readily available, Dr. Bellanti proceeded as if Dr. Koff's opinion and literature did not exist. This apparent willful blindness happened in every case.

Dr. Bellanti's opinion in each case suffered from one or more significant flaws that are directly tied to his lack of expertise about autoimmune hepatitis. These are not points on which experts typically dispute. Battles between experts are common in vaccine Program cases. See Sword, 44 Fed. Cl. at 188. Rather, Dr. Bellanti's errors concern such fundamental issues over which there was no justifiable dispute that questions about Dr. Bellanti's competence to discuss liver diseases as an expert have arisen.

The list of fundamental errors includes:

Myers	failing to appreciate the difference between autoimmune hepatitis and nonalcoholic steatohepatitis.

Rotoli	failing to appreciate that Ms Rotoli's liver biopsy showed such extensive damage (fibrosis) that the disease must have begun before she received the first dose of the hepatitis B vaccine.
Porter	failing to recognize an alternative cause for her autoimmune hepatitis: minocycline. After Dr. Koff raised this issue, Dr. Bellanti was not prepared to explain why the hepatitis B vaccine was more likely than the minocycline to be the cause.
Torbett	failing to recognize an alternative cause for her autoimmune hepatitis: minocycline. After Dr. Koff raised this issue, Dr. Bellanti was not prepared to explain why the hepatitis B vaccine was more likely than the minocycline to be the cause.

As stated, these mistakes are serious. These are errors that directly undermine Dr. Bellanti's opinion. They are also issues on which Dr. Bellanti lacked any effective rebuttal. Therefore, the evidence from each case solely supports a finding that Dr. Bellanti lacks credibility. However, the repetition of significant errors reinforces the finding that Dr. Bellanti lacked credibility.[10]

C. Dr. Bellanti's Demeanor

The analysis in sections A and B, above, is based upon the written material, primarily Dr. Bellanti's report and the transcript of his testimony. The lack of credibility is apparent on this information alone. But, Dr. Bellanti's demeanor during his testimony strongly reinforces the doubts about Dr. Bellanti's veracity. A fact finder may evaluate an expert's demeanor in determining credibility. Andrew Corp. v. Gabriel Electronics, Inc., 847 F.2d 819, 824 (Fed. Cir. 1988).

Evaluations of credibility by fact-finders who observe testimony are accorded "great deference." Pafford v. Sec'y of Health & Human Servs., 451 F.3d 1352, 1359 (Fed. Cir. 2006); cert. denied, ___ U.S. ___, 127 S. Ct. 2909 (2007); accord Energy Capital Corp. v. United States, 302 F.3d 1314, 1329 (Fed. Cir. 2002).

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[10] During any application for attorneys' fees, the conduct of petitioner's counsel can be evaluated. Dr. Koff's report and literature also alerted counsel to important issues. As an advocate, counsel is responsible for anticipating arguments from the other side and preparing a response. As an officer of the court, counsel is responsible for ending litigation when the likelihood of prevailing is remote. See Perreira v. Sec'y of Health & Human Servs., 33 F.3d 1375, 1376-77 (Fed. Cir. 1994) (affirming special master's decision not to award all attorneys' fees).

At several points, Dr. Bellanti's demeanor suggested that he was uncomfortable with the topic being discussed. These included:

1) being evasive during cross-examination about molecular mimicry. Tr. 86

2) being evasive during cross-examination about bystander activation. Tr. 87

3) appearing uncomfortable and not having a better answer when asked about rechallenge. Tr. 103

4) appearing unsettled when asked to discuss his training in gastroenterology. Tr. 106.

5) appearing uncomfortable when providing a summary of his opinion in Ms. Hager's case. Tr. 220.

6) lacking confidence in his testimony when he stated that Mr. Myers's fevers, chills, headaches were due to the vaccine, and not a virus that was affecting other family members. Tr. 508-09.

7) appearing uncomfortable when admitting that he did not know when Ms. Rotoli's autoimmune hepatitis began but, nonetheless, maintaining that the temporal relationship is appropriate. Tr. 597.

8) appearing unfamiliar with the fact that Ms. Rotoli did not respond to the hepatitis B vaccination. Tr. 606.

9) appearing uncomfortable when informed that Ms. Rotoli's liver biopsy showed moderate fibrosis in her liver. Tr. 607.

10) appearing uncomfortable when asserting that the history of Ms. Porter's autoimmune hepatitis shows that the hepatitis B vaccine, not the minocycline, caused her disease. Tr. 959.

It is probably not a coincidence that this list of instances when Dr. Bellanti's demeanor suggested a weakness in his testimony matches many topics for which his opinion was found not to be credible. Given all the circumstances, a reasonable inference to be drawn from Dr. Bellanti's demeanor is that he was aware that his opinion was flawed, yet he chose to provide it anyway.

D. Overall Conclusion Regarding Dr. Bellanti

A consideration of Dr. Bellanti's report, his testimony, and his demeanor while testifying raises significant concerns not just about Dr. Bellanti's persuasiveness but also his truthfulness.

Although this point has been made several times, it bears repeating. The origins about these serious questions are not based upon mere disagreements between experts. Almost every vaccine case involves some dispute between experts. Resolving a reasoned disagreement between experts is a primary function of special masters. Simply finding an expert is not persuasive differs from finding an expert not credible. Here, repeatedly, on significant issues, Dr. Bellanti has presented no credible basis for most (if not all) assertions.

Several times, Dr. Bellanti resorts to describing adverse reactions to the hepatitis B vaccine as "rare cases." Tr. 36-40, 93, 201, 499, 528. Invoking this phrase seems to be equivalent to asking that the requirement for reliable evidence be disregarded. However, even in "rare cases," petitioners bear the burden of presenting evidence to make their experts' theories reliable.

Here, so many questions about the basis for Dr. Bellanti's statements, contained in either his report or his testimony, have led to a question about Dr. Bellanti's veracity. As a professor and published author, Dr. Bellanti should appreciate the need for some evidence to substantiate his theories. Dr. Bellanti failed to present any evidence that was credible and persuasive to support his statements and opinions. Consequently, Dr. Bellanti's opinion, as a whole, lacks any persuasiveness.

In this case, the quality of Dr. Bellanti's work appears to be inconsistent with previous work. In other cases, Dr. Bellanti has offered opinions that a vaccine caused a particular condition that Special Masters have found persuasive. E.g., Keenan v. Sec'y of Health & Human Servs., No. 99-561V, 2007 WL 1231592 *10 (Fed. Cl. Spec. Mstr. Apr. 5, 2007); Bowes v. Sec'y of Health & Human Servs., No. 01-481V, 2006 WL 2849816 (Fed. Cl. Spec. Mstr. Sept. 8, 2006). For some reason(s), the quality of Dr. Bellanti's work in the present cases fell below what is expected of an expert. In future cases, it is expected that Dr. Bellanti's work, beginning with his report, will again achieve a high quality.

VI. Conclusion

Ms. Torbett has not established that the hepatitis B vaccine was the cause of her autoimmune hepatitis. Thus, she is not entitled to compensation. The Clerk's Office is ordered to enter judgment consistent with this decision unless a timely motion for review is filed.

IT IS SO ORDERED.

S/ Christian J. Moran
Christian J. Moran
Special Master