

In the United States Court of Federal Claims
OFFICE OF SPECIAL MASTERS

JESSIE CONTRERAS,	*	
	*	
Petitioner,	*	No. 05-626V
	*	Special Master Christian J. Moran
v.	*	
	*	Filed: April 5, 2012
SECRETARY OF HEALTH	*	
AND HUMAN SERVICES,	*	
	*	hepatitis B vaccine, transverse
Respondent.	*	myelitis, one day onset

Jeffrey S. Pop, Jeffrey S. Pop & Associates, Beverly Hills, CA, for petitioner;
Linda S. Renzi, United States Dep't of Justice, Washington, DC, for respondent.

PUBLISHED DECISION DENYING ENTITLEMENT TO COMPENSATION¹

Jessie Contreras alleges that either a hepatitis B vaccination or a tetanus-diphtheria vaccination caused him to develop a neurological problem that began within one day of his vaccination. Mr. Contreras seeks compensation pursuant to the National Childhood Vaccine Injury Compensation Program, 42 U.S.C. §§ 300aa-1 et seq. (2006).

Mr. Contreras relies primarily upon the testimony of Lawrence Steinman. Dr. Steinman, who possesses outstanding credentials in the field of neurology and immunology, offered a theory to explain how one of the vaccines could have caused Mr. Contreras to develop his neurological disorder. Dr. Steinman's opinion was opposed by John Sladky, an experienced pediatric neurologist, and J. Lindsay

¹ The E-Government Act of 2002, Pub. L. No. 107-347, 116 Stat. 2899, 2913 (Dec. 17, 2002), requires that the Court post this decision on its website. Pursuant to Vaccine Rule 18(b), the parties have 14 days to file a motion proposing redaction of medical information or other information described in 42 U.S.C. § 300aa-12(d)(4). Any redactions ordered by the special master will appear in the document posted on the website.

Whitton, Ph.D., who specializes in immunology. The main point of disagreement among the experts was whether one day is a medically appropriate amount of time to infer causation. On this point, Dr. Sladky and Dr. Whitton were persuasive in showing that one day is not a sufficient amount of time for a vaccine to cause transverse myelitis. Thus, Mr. Contreras has failed to demonstrate that he is entitled to compensation.

I. Facts

The parties do not dispute the accuracy of medical records created contemporaneously with the events being described in those records. These records are the basis for the following facts.

Mr. Contreras was born in 1990. For his first 13 years, Mr. Contreras was generally healthy, see exhibit 3 and exhibit 4, and respondent has not suggested that any early illness contributed to his development of the neurological disorder. See Resp't Br., filed Nov. 24, 2010, at 3. In this time, Mr. Contreras received doses of the diphtheria-tetanus-pertussis vaccine on May 12, 1990, September 5, 1990, February 12, 1991, January 20, 1993, and September 2, 1994. Exhibit 4 at 5, 7-9; petition, filed June 15, 2005, at ¶¶ 5-9. He did not experience any adverse reaction to these five doses. Similarly, Mr. Contreras received two doses of the hepatitis B vaccine (the first on January 23, 2001, and the second on August 23, 2001) without any adverse reaction.

On June 16, 2003, Mr. Contreras saw his pediatrician, Dr. Fred Kyazze, for a routine examination during which he was given a hepatitis B vaccination and a tetanus diphtheria vaccination. Exhibit 4 at 44. This was the sixth time that Mr. Contreras had encountered some form of the tetanus diphtheria vaccine and the third dose of the hepatitis B vaccine. Dr. Kyazze administered the vaccinations at approximately 10:30 A.M.

Shortly before noon on June 17, 2003, Mr. Contreras started crying and told his mother that he felt bad.² He complained that his hands were numb and that he had “a strong pain in his back.” Tr. 15-16. After Mr. Contreras’s mother reported these problems to his pediatrician, she was instructed to take her son to the nearest

² To be precise, the onset of Mr. Contreras’s neurological symptoms appeared approximately 25 hours after the vaccination. For convenience, this decision refers to the interval as “one day.”

emergency room, which was Memorial Hospital of Gardena in Gardena, California. Exhibit 8 (affidavit of Rosa Contreras) ¶ 26.

When Mr. Contreras left his home for the emergency room with his parents, he walked to his family's car without assistance. During the car trip, he could not maintain his balance and his mother moved from the front seat to the rear seat to help him. When the family arrived at the emergency room, Mr. Contreras vomited in the parking lot twice. His mother and father carried him to the emergency room because he could not walk. Tr. 17.

In the emergency room, Mr. Contreras was seen by Mark Wagner, who testified at the hearing in this case. Dr. Wagner is board-certified in emergency medicine. Dr. Wagner noted that Mr. Contreras had weakness in his arms and legs, was retaining urine, and had priapism. Exhibit 6 at 2-5; see also tr. 82. A computed tomography (CT) scan of his head and cervical spine was normal. Magnetic resonance imaging (MRI) of his cervical spine was also normal. Exhibit 6 at 15-18. Dr. Wagner stated that Mr. Contreras could have atypical Guillain-Barré syndrome, transverse myelitis, and priapism. Dr. Wagner offered the opinion in this litigation that the hepatitis B vaccine caused Mr. Contreras's neurological problem. Tr. 89-92.

After remaining in Memorial Hospital for approximately two and a half hours, Mr. Contreras was transferred by ambulance to a higher care facility, Long Beach Memorial Hospital, which is also known as Miller Children's Hospital. Exhibit 6 at 5. Mr. Contreras remained in this facility until he was discharged on September 11, 2003. Exhibit 13 at 3, ¶ 5. The history at Miller Children's Hospital taken at admission, exhibit 7 at 1-5, is consistent with the facts set forth above.

While in Miller Children's Hospital, Mr. Contreras underwent additional tests. Another MRI of his cervical spine, taken on June 18, 2003, showed an abnormally high signal intensity from C2-3 interspace to C7. Exhibit 7 at 167-69. Mr. Contreras's primary physician at Miller Children's Hospital, Jeremy S. Garrett, indicated that the appropriate diagnosis for him was transverse myelitis. Exhibit 13 at 5-6.

Dr. Garrett, helpfully, provided additional information about his background by providing his curriculum vitae (exhibit 127) and about his treatment of Mr.

Contreras by submitting an affidavit.³ Dr. Garrett is board-certified in general pediatrics and pediatric critical care. Exhibit 13 ¶ 1, exhibit 127.

Dr. Garrett explained that Mr. Contreras's initial presentation suggested that the differential diagnosis included thrombosis of the anterior spinal artery, a traumatic injury, and a type of demyelinating injury. Testing eliminated some possibilities, leaving only demyelinating illnesses such as transverse myelitis, atypical Guillain-Barré syndrome, acute disseminated encephalomyelitis, and multiple sclerosis. Eventually, Dr. Garrett determined that Mr. Contreras suffered from transverse myelitis.

Transverse myelitis is a condition in which inflammation causes damage to the spinal cord. The clinical presentation often develops suddenly and is usually marked by bladder and bowel problems, a loss of movements in the legs, and numbness. See exhibit N, tab 1 (Douglas A. Kerr & Harold Ayetey, Immunopathogenesis of Acute Transverse Myelitis, 15(3) Current Opinion in Neurology 339 (2002)).

What causes transverse myelitis is not known. Id. at 339 (stating that for acute transverse myelitis "[i]t is unclear what are the triggers and effector mechanisms"). The testifying experts agreed that what causes transverse myelitis is not known. Tr. 264; tr. 267 (Dr. Steinman); tr. 300-01 (Dr. Sladky); tr. 414 (Dr. Whitton).

While Dr. Garrett was treating Mr. Contreras for transverse myelitis, Dr. Garrett attempted to determine its cause. After eliminating other potential causes, Dr. Garrett was left with two possibilities: either idiopathic or the hepatitis B vaccination. One of Dr. Garrett's treatment notes states that "[w]e will also make sure that the infectious disease department reports to the Hepatitis B vaccination distributor the fact that the patient probably contracted or potentially contracted the transverse myelitis secondary to the Hepatitis B vaccine." Exhibit 7 at 106. Dr. Garrett, later, expanded on his reasoning in his affidavit. Exhibit 13 ¶ 12.

Mr. Contreras's condition worsened for approximately five days following his admission to Miller Children's Hospital. Among the problems he experienced were quadriplegia, acute respiratory failure, neurogenic bladder, acute cystitis, and

³ Dr. Garrett could not testify in person at the hearing or telephonically because of his professional duties. Exhibit 147 ¶ 2.

priapism. Exhibit 13 ¶ 10; see also exhibit 7, passim, especially pages 6-8 (discharge summary).

Fortunately, Mr. Contreras improved. In early July 2003, he started to make some small movements with his hands and feet. He began to eat orally on July 17, 2003. He was transferred to a rehabilitation facility on July 30, 2003. He was discharged on September 11, 2003, and by that date, Mr. Contreras could feed himself finger foods, dress himself with some assistance, and walk 150 feet with a platform walker.

At the time of the hearing in Los Angeles, California, Mr. Contreras described himself as having average health. He reported that he could walk, but not for long periods of time. Tr. 39.

II. Procedural History

Mr. Contreras filed his petition in June 2005. The petition was accompanied by seven volumes of medical records. Approximately two thousand pages (five volumes) came from Mr. Contreras's time at Miller Children's Hospital, exhibit 7. The initial submission also included affidavits from Mr. Contreras's mother, his father, Dr. Kyazze, Dr. Wagner, and Dr. Garrett. Additionally, there was an affidavit from Dr. Charles Poser (exhibit 22) and eight medical articles.

The Secretary filed her report pursuant to Vaccine Rule 4 on October 7, 2005, and indicated that Mr. Contreras was not entitled to compensation. The Secretary addressed both the tetanus-diphtheria vaccination and the hepatitis B vaccination. For tetanus-diphtheria, the Secretary acknowledged that the Institute of Medicine had found that the evidence favors a causal connection between tetanus toxoid and Guillain-Barré syndrome in 1994. Exhibit V at 89.⁴ However, the Secretary maintained that a more recent epidemiological study showed that receipt of a vaccine containing a tetanus toxoid vaccine does not increase the likelihood that a person develops Guillain-Barré syndrome. Exhibit B (Jessica Tuttle et al., The Risk of Guillain-Barré Syndrome after Tetanus-Toxoid-

⁴ With her report, the Secretary had intended to submit pertinent portions of the 1994 IOM report as exhibit A. However, exhibit A does not reproduce the relevant pages of the 1994 IOM report and the correct pages were filed later as exhibit V.

Containing Vaccines in Adults and Children in the United States, 87 (12) Amer. J. Pub. Health 2045 (1997)).

Additionally, the Secretary indicated that the evidence did not support a finding that the hepatitis B vaccine can cause a demyelinating condition. For this position, the Secretary relied upon a 2002 report from the IOM. Resp't Rep't at 9, citing exhibit C (Institute of Medicine, Immunization Safety Review: Hepatitis B Vaccine and Demyelinating Neurological Disorders (Kathleen Stratton et al., eds. 2002)).

Finally, respondent questioned the temporal relationship. Respondent argued that even if a vaccine could cause a demyelinating condition, "a plausible interval between vaccination and the onset of symptoms is 5-45 days." Resp't Rep't at 9. Therefore, respondent maintained that Dr. Poser's report was insufficient to establish a causal connection in Mr. Contreras's case because Dr. Poser did not explain how a vaccine could cause symptoms within 24 hours of vaccination. Id. at 10.

Shortly after the Secretary filed her report, the Secretary presented a report from John Sladky.⁵ Dr. Sladky is board-certified in pediatrics, neurology with a special competence in child neurology, and electrodiagnostic medicine. Since 1995, he has been employed as the chief of the division of pediatric neurology at Emory University School of Medicine. Exhibit J at 2-3.

Dr. Sladky's report began with a summary of Mr. Contreras's medical history. From the information available to him, Dr. Sladky stated that "the illness resulting in Jessie's neurological injury was, almost certainly, transverse myelitis." Exhibit I at 2.

Dr. Sladky disagreed with the statements from Dr. Garrett and Dr. Poser that a vaccine caused Mr. Contreras's neurological illness. Dr. Sladky challenged their reliance on a series of anecdotal case reports and noted that "[t]he absence of alternative explanation cannot be construed to support causality." Additionally, Dr. Sladky contended that "the brief interval between the hepatitis B administration and the onset of symptoms of transverse myelitis in Jessie Contreras

⁵ Initially, the Secretary designated Dr. Sladky's report as exhibit A and his curriculum vitae as exhibit B. In doing so, she duplicated these labels. The Secretary was instructed to re-file the two documents and she designated them as exhibit I and exhibit J.

is the most compelling evidence that immunization and demyelinating disease, in this instance, are purely coincident.” In connection with this point, Dr. Sladky cited, among other published works, the 1994 IOM report. Exhibit I at 2-3.

Mr. Contreras obtained a supplemental report from Dr. Poser in which Dr. Poser responded to Dr. Sladky. Dr. Poser primarily argued against relying upon epidemiological studies because they cannot account for Mr. Contreras’s uniqueness. Additionally, Dr. Poser opined that the “unusually short” interval happened because Mr. Contreras had received a third dose of the hepatitis B vaccination. Mr. Contreras also received a dose of the tetanus-diphtheria vaccine. These earlier doses “primed” Mr. Contreras’s nervous system. Exhibit 23.

In early November 2005, both parties submitted articles on which their experts relied. Although not reflected on the docket, it appears that Special Master Edwards, who was assigned the case at the time, distributed to the parties a copy of his unpublished decision in Avila v. Sec’y of Health & Human Servs., 01-009V (Fed. Cl. Spec. Mstr. Feb. 11, 2004). Avila appears to be relevant because in that case Special Master Edwards found that “general medical tenets establish that the interval between an immunological challenge and the manifestation of an immune-mediated disorder is at least five days.” Id. at 5.

The context suggests that Avila was discussed at the next status conference, which was held on November 17, 2005. Following this status conference, Mr. Contreras was ordered to file an opinion of an immunologist or a neuroimmunologist.

Mr. Contreras complied with this order by obtaining a report from Lawrence Steinman. Dr. Steinman is a professor in Stanford University’s Departments of Neurology and Neurological Sciences, Pediatrics and Genetics. He chairs that institution’s program in immunology. He has received national and international honors for his work in researching multiple sclerosis. Exhibit 56 (curriculum vitae).

Dr. Steinman agreed with the diagnosis reached by Mr. Contreras’s treating doctors, transverse myelitis. Dr. Steinman also stated that Mr. Contreras’s problem involved nerve roots so that “a second diagnosis of inflammatory polyradiculopathy/polyneuropathy [Guillain Barre Syndrome] could also be made.” Exhibit 55 at 2 (bracketed material in original).

Dr. Steinman linked Mr. Contreras's condition to the vaccinations that he received. Dr. Steinman emphasized the hepatitis B vaccine, explaining that the hepatitis B vaccine caused Mr. Contreras "to develop immune responses that are cross-reactive with myelin proteins." In this report, Dr. Steinman maintained that Mr. Contreras's previous exposure to the Epstein Barr virus made him "sensitized to central nervous system components in the myelin sheath." Exhibit 55 at 2-3.

Dr. Steinman also discounted the epidemiological studies cited by Dr. Sladky, who had opined that the hepatitis B vaccine does not increase the risk of developing a demyelinating disorder. Dr. Steinman opined that "[t]here is simply no case control epidemiological study on the subject to cite in this instance." As for the epidemiology studies identified by Dr. Sladky, Dr. Steinman questioned the usefulness of those studies because they did not necessarily involve Hispanics. Exhibit 55 at 3-4.

As to the timing in Mr. Contreras's case, Dr. Steinman opined that the hepatitis B vaccine can trigger "acute transverse myelitis and Guillain Barre syndrome in a time period of 24-72 hours, just as a tuberculin reaction can be elicited within 24-72 hours in a patient already sensitized to mycobacteria tuberculosis." Dr. Steinman relied upon two case reports. Exhibit 55 at 3.

Following the filing of Dr. Steinman's report, the parties entered into negotiations to resolve this case. As part of this process, Mr. Contreras obtained updated medical records, school records, a report about his vocational prospects, and a life care plan. Eventually, Special Master Edwards referred the case to a different special master, who attempted to facilitate resolution of this case. While the case was being considered for alternative dispute resolution, Special Master Edward's tenure concluded and the case was reassigned to the undersigned.

In December 2008, the parties reported that settlement efforts were not successful. Thus, the case returned to a path leading to a hearing. Because the most recently filed expert report was submitted by Mr. Contreras, the Secretary was ordered to file a response to Dr. Steinman's opinion.

In February 2009, the Secretary submitted a report from Lindsay Whitton, his curriculum vitae, and the articles on which he relied. Exhibit L and exhibit M. Dr. Whitton obtained the equivalent of an American medical degree from the University of Glasgow, Scotland in 1979, and a Ph.D. from the same institution in 1984. He was working as a professor in the Department of Immunology and Microbial Science at Scripps Research Institute in La Jolla, California. Exhibit M.

Dr. Whitton agreed with Dr. Steinman that Mr. Contreras suffered from Guillain-Barré syndrome and concurrent transverse myelitis. At that point, Dr. Whitton and Dr. Steinman disagree. Dr. Whitton maintained that “there is no scientifically-acceptable evidence that childhood vaccinations cause autoimmune diseases.” Exhibit L at 5. Dr. Whitton discussed the value of large-scale studies, which show no link between vaccinations and demyelinating neurological diseases, and the value of case reports. *Id.* at 5-8. Dr. Whitton also explained why 24 hours is not a sufficient amount of time for a vaccine to cause the damage claimed by Mr. Contreras. One problem with Dr. Steinman’s sequence was that the portion of the immune system allegedly responsible for harming the myelin, a T cell, is not produced by the body until three days after the body encounters an antigen, such as the hepatitis B vaccine. *Id.* at 8-10. Finally, Dr. Whitton addressed the affidavits supplied by Mr. Contreras’s treating doctors, the report of Dr. Poser, and the report of Dr. Steinman. *Id.* at 11-14.

Mr. Contreras obtained a rebuttal report from Dr. Steinman. Dr. Steinman stated that his theory of how an aberrant reaction to the hepatitis B vaccine can cause a demyelinating condition is mediated not through T cells, as Dr. Whitton asserted, but rather through antibodies, a different component of the immune system. Exhibit 105 at 2-3. Dr. Steinman also maintained that the timing is appropriate in Mr. Contreras’s case because T cells can react more quickly when they encounter an antigen for a second time compared with the response time for an initial exposure. *Id.* at 7. Dr. Steinman also continued to dispute the epidemiological evidence, citing two studies of the 1976 swine flu immunization, exhibit 122 (Lawrence B. Schonberger et al., Guillain-Barre Syndrome Following Vaccination in the National Influenza Immunization Program, United States, 110(2) *Amer. J. Epidemiology* 105 (1979)), and exhibit 121 (Alexander D. Langmuir et al., An Epidemiologic and Clinical Evaluation of Guillain-Barré Syndrome Reported in Association with the Administration of Swine Influenza Vaccines, 119(6) *Amer. J. Hygiene* 841 (1984)). *Id.* at 8.

In August 2009, the case was tentatively scheduled for a hearing in April 2010. The parties continued to develop their cases before the hearing.

In September 2009, the Secretary filed a supplemental report from Dr. Whitton to address Dr. Steinman’s rebuttal. First, Dr. Whitton maintained that Dr. Steinman’s original report (exhibit 55) relied upon T cells, not antibodies. Second, Dr. Whitton suggested that for a variety of reasons, Mr. Contreras was likely to have suffered from transverse myelitis but not Guillain-Barré syndrome. Third,

Dr. Whitton disagreed with the assertion that a vaccination, even a repeated dose of a vaccination, could lead to a demyelinating disease within one day. Finally, Dr. Whitton discussed the Schonberger and Langmuir papers and asserted that neither of these papers supported a causal relationship within approximately 18 hours of the vaccine. Exhibit N at 9.⁶

An in-depth status conference was held on February 12, 2010. During this conference, various items were identified as missing and the parties were ordered to complete the record. For example, Mr. Contreras filed an updated report from Dr. Steinman and an updated curriculum vitae. Exhibits 124-125.

On March 8, 2010, respondent filed a supplemental report from Dr. Sladky.⁷ This supplemental report was needed because Dr. Sladky had not addressed the reports from Dr. Steinman, which were filed after Dr. Sladky issued his opinion in October 2004. Dr. Sladky confirmed the usefulness of the epidemiological studies on which he had originally relied. Dr. Sladky continued to maintain that Dr. Steinman had not presented a persuasive reason to explain how a demyelinating condition could develop within one day. Dr. Sladky also questioned how Dr. Steinman determined that Mr. Contreras developed Guillain-Barré syndrome (as opposed to or in addition to transverse myelitis). Exhibit P.

A pre-hearing conference was held on April 1, 2010. During this conference, the parties discussed arguments that were presented in their previously filed pre-trial briefs.

A hearing was held on April 19-20, 2010, in Los Angeles, California. Mr. Contreras testified and presented testimony from his mother, Dr. Kyazze, Dr. Wagner, and Dr. Steinman. The Secretary called Dr. Sladky and Dr. Whitton as witnesses. During the hearing, the witnesses referred to articles that had not been filed into the record previously. The parties were ordered to submit these articles.

After the evidentiary record was closed, the parties filed briefs. Mr. Contreras filed a primary brief, the Secretary filed one brief, and Mr. Contreras filed a reply brief. With the reply brief, Mr. Contreras submitted medical articles

⁶ During his testimony, Dr. Whitton stated that his reference to 18 hours was in error. However, the correct interval (24 hours) does not affect his opinion.

⁷ Originally, respondent filed Dr. Sladky's supplemental report as exhibit O. However, a later order redesignated it as exhibit P.

that had not been disclosed previously, exhibits 148-151.⁸ After reviewing those articles, the undersigned determined that assistance from an expert would help explain the meaning of those articles. Thus, a supplemental hearing was held on July 28, 2011. The parties also filed supplemental briefs following the supplemental hearing. With the filing of supplemental briefs, this case is ready for adjudication.

III. Analysis

As described in the procedural history, the evidentiary presentations in this case were robust. Mr. Contreras obtained oral testimony from two of his treating doctors, Dr. Kyazze and Dr. Wagner, and two affidavits from another treating doctor, Dr. Garrett. For the purpose of this litigation, Mr. Contreras retained two additional doctors, Dr. Poser and Dr. Steinman. Respondent also retained two doctors, Dr. Sladky and Dr. Whitton. Taken together, the parties filed more than 100 medical articles.

There are three points of dispute between the two sides. The preliminary question is the least important and concerns the disease that afflicted Mr. Contreras. The second disputed issue is whether the hepatitis B vaccine can cause a demyelinating condition, such as transverse myelitis, under any circumstances. This decision does not resolve this question because the outcome of Mr. Contreras's case depends upon the resolution of the third point of dispute. The last (and most critical) question is whether the hepatitis B vaccine can cause a demyelinating condition within one day.

There is little persuasive evidence to support Dr. Steinman's assertion that a vaccine can lead to a demyelinating condition within one day. Although Dr. Steinman is an accomplished and honored medical researcher, his explanation was opposed by Dr. Sladky and Dr. Whitton, two other doctors with outstanding

⁸ These late filed articles did not assist Mr. Contreras's proof in any way. They presented experiments in which tuberculin was injected directly into the brains of animals. The articles provide no useful information about how the blood brain barrier, which is discussed extensively below, would permit or impede the flow of immune cells from the periphery into the central nervous system.

credentials.⁹ According to Dr. Sladky and Dr. Whitton, the way Dr. Steinman links Mr. Contreras's demyelinating disease is medically impossible. Their opinion is persuasive. Consequently, Mr. Contreras has failed to present preponderant proof that a vaccination caused his demyelinating disease. The reasons for this finding are set forth in detail in section B below, which follows the analysis of the disease affecting Mr. Contreras.

A. Which Disease Affected Mr. Contreras

Mr. Contreras maintains that he suffered from Guillain-Barré syndrome and transverse myelitis. Pet'r Br., filed Aug. 23, 2010, at 13. The Secretary disagrees and contends that the only appropriate diagnosis is transverse myelitis. Resp't Br., filed Nov. 24, 2010, at 4.

A preponderance of the evidence supports finding that transverse myelitis is the sole diagnosis. The critical evidence on this point is the view of Dr. Garrett, who treated Mr. Contreras during his lengthy hospitalization at Miller Children Hospital at Long Beach Memorial Medical Center. Dr. Garrett observed Mr. Contreras and concluded that Mr. Contreras suffered from cervical transverse myelitis. Exhibit 13 at 5-6. His determination is entitled to substantial weight. Capizzano v. Sec'y of Health & Human Servs., 440 F.3d 1317, 1326 (Fed. Cir. 2006).

The finding that Mr. Contreras did not suffer from Guillain-Barré syndrome is not particularly important to the outcome of Mr. Contreras's petition. In the circumstances of Mr. Contreras's case, the similarities between Guillain-Barré syndrome and transverse myelitis are more important than the differences between those conditions. Both Guillain-Barré syndrome and transverse myelitis are diseases in which portions of the nervous system are demyelinated. Both diseases may be caused via an autoimmune process. As explained previously, whether an immune-mediated demyelination can be caused by a vaccination when the vaccination is given 25 hours before the symptoms of demyelination appear is the

⁹ A refreshing aspect about this case is that the experts showed respect for each other's abilities. See, e.g., tr. 438 (Dr. Whitton's testimony that Dr. Steinman is a "truly renowned neurologist" about whom Dr. Whitton heard when he was in medical school in Scotland); tr. 551 (Dr. Whitton's testimony that he has cited Dr. Steinman's studies); tr. 582 (Dr. Steinman's testimony that Dr. Whitton "is one of the top people in our field").

critical question for Mr. Contreras's case. Thus, the parties do not view the exact diagnosis as an important part of this case. Pet'r Br., filed Aug. 23, 2010, at 15; Resp't Br., filed Nov. 24, 2010, at 5.

Because a preponderance of the evidence shows that Mr. Contreras suffered from transverse myelitis, this decision references transverse myelitis. It is important to emphasize that the same result would be reached if Mr. Contreras suffered from both transverse myelitis and Guillain-Barré syndrome. The outcome of Mr. Contreras's case depends on the interval between his vaccinations and the onset of his disease, not on the specific disease.

B. Can Vaccinations Cause Transverse Myelitis within One Day?

Dr. Steinman opined that the hepatitis B vaccination can cause transverse myelitis via a process known as molecular mimicry and this process can occur within one day. Exhibit 124 at 3. As described in section 1 below, molecular mimicry is a process comprised of several discrete steps. The minimal amount of time needed for some of these steps is described in section 2. Based upon the minimal amount of time needed for the biologic processes, the overall amount of time needed for molecular mimicry is at least five days. This finding is in accord with various animal studies that reported observations of reactions that are assumed to be mediated via molecular mimicry. These animal studies are reviewed in section 3. Section 3 also contains an analysis of one case report about a child from India.

Dr. Steinman proposes that a molecular mimicry reaction can take place in one day. Dr. Steinman primarily relies upon an analogy to the tuberculin skin test, and a theory based on sensitization. For reasons explained in section 4 below, these arguments are not persuasive. A final section (section 5) is devoted to the opinions of treating doctors cited by Mr. Contreras.

1. Steps Involved in Molecular Mimicry

Molecular mimicry is a theory commonly advanced by petitioners to explain how a vaccine can cause an injury, particularly a demyelinating injury. Molecular mimicry appears in articles published in highly regarded medical journals and Dr. Steinman has written some of these articles. See tr. 126-128 (discussing exhibits 63, 143-44). Dr. Steinman has testified about molecular mimicry and he has

explained the basic concepts as well as, if not better than, any expert appearing in the Vaccine Program.

A foundation for understanding molecular mimicry starts with the fact that the immune system is designed to detect foreign substances, known as antigens. Antigens are built from proteins that, in turn, are a sequence of amino acids. Cells in the immune system circulate throughout the body, examining molecules to determine whether the molecule is part of the body (self) or is foreign to the body (an antigen). This determination is made by examining specific sequences of a few amino acids, known as a peptide. When a patrolling cell of the immune system identifies a foreign peptide, this cell recruits other parts of the immune system to destroy the foreign antigen. Tr. 127-30; exhibit 63 (Lawrence Steinman, Autoimmune Disease: Misguided Assaults on the Self Produce Multiple Sclerosis, Juvenile Diabetes and Other Chronic Illnesses. Promising Therapies Are Emerging, Scientific Amer. 107 (1993)) and exhibit 143 (extract from exhibit 63). The destructive part of the immune system is divided into two types of cells, B cells (also known as antibodies) and T cells.

When the immune system functions properly, the body stays healthy. However, the immune system can deviate from its normal function by attacking its host. This produces autoimmune diseases, such as transverse myelitis. Tr. 124-25.

Molecular mimicry is an attempt to explain why the immune system goes awry. It posits that the antigen contains a sequence of amino acids that resembles (or mimics) a sequence of amino acids that is similar to a sequence of amino acids normally present in the host. When the immune system responds to the antigen, the destructive T cells are directed against the body's own tissue mistakenly. In this particular case, Dr. Steinman identifies the hepatitis B vaccine as the triggering antigen and a portion of Mr. Contreras's spinal cord, known as myelin, as the tissue that is attacked. Tr. 123-24.¹⁰

To this basic outline about molecular mimicry, Dr. Whitton provided additional details. Dr. Whitton explained that multiple steps are needed. Dr. Whitton stated:

¹⁰ Dr. Sladky and Dr. Whitton do not agree with the assertion that the hepatitis B vaccine can cause transverse myelitis. Exhibit I (Dr. Sladky) at 6; exhibit N (Dr. Whitton, Supp'l Rep't) at 10. However, this broader question is being set aside because of the answer to the narrow issue about the medically appropriate interval between vaccination and the onset of symptoms.

If the vaccine-induced T cells are to have caused disease, the following must have happened. (i) The vaccine was injected at a peripheral site (arm/leg). (ii) The vaccine antigens were carried to a lymph node; (iii) in the node, the memory T cells (induced by the previous vaccinations . . .) must have (iv) recognized the antigen, (v) divided and (vi) moved to the sites where disease occurred, in this case the cervical spinal cord (to cause transverse myelitis), and some peripheral nerves (to cause GBS-like disease). . . . Once they reached the sites the T cells would (vii) have to recognize the putative (but unidentified) cross-reactive antigen, and (viii) activate their so-called ‘effector functions’ to cause harm to the nerve cells. And (ix) it seems reasonable to propose that a fairly large number of T cells would need to accumulate in the spinal cord / peripheral nerves, in order to cause the serious signs and symptoms Jessie showed less than 24 hours after vaccination.

Exhibit L at 9. In reference to this sequence of steps, Dr. Steinman testified that “Dr. Whitton is entirely right.” Tr. 240.¹¹

2. How Much Time Does Molecular Mimicry Take

The preceding explanation of how molecular mimicry can theoretically cause an autoimmune demyelinating disease is an important aspect of this case. Petitioners must establish that the condition for which they seek compensation arose in a “medically appropriate” interval between vaccination and injury. Bazan v. Sec’y of Health & Human Servs., 539 F.3d 1347, 1352 (Fed. Cir. 2008); see also Althen v. Sec’y of Health & Human Servs., 418 F.3d 1274, 1278 (Fed. Cir. 2005). The Court of Federal Claims has interpreted this element as requiring “preponderant proof that the onset of symptoms occurred within a timeframe for which, given the medical understanding of the disorder’s etiology, it is medically acceptable to infer causation-in-fact.” Veryzer v. Sec’y of Health & Human Servs.,

¹¹ In this portion of Dr. Steinman’s testimony, he was also addressing his analogy to the tuberculin skin test. The tuberculin skin test is discussed in section 4 below.

100 Fed. Cl. 344, 356 (2011), appeal docketed, No. 2012-5034 (Fed. Cir. Jan. 3, 2012) (quoting Bazan, 539 F.3d at 1352).

Here, the experts differed in the minimal amount of time for an autoimmune reaction. Dr. Steinman opined that 24 hours was a medically appropriate time. Exhibit 124 at 3-4.¹² Dr. Sladky stated “It is virtually impossible to believe that the intricate process of immune activation, tissue targeting and ultimately immunological attack on the nervous system could occur within a 24 hour period.” Dr. Sladky offered the opinion that the minimum amount of time was five days. Exhibit I at 3. In response to Dr. Steinman’s suggested time frame of 24 hours, Dr. Whitton stated that “it is exceedingly unlikely that the immune response could have so rapidly harmed the spinal cord (transverse myelitis) and peripheral nerves.” Exhibit L at 9. Dr. Whitton stated that under especially favorable circumstances, the effects of molecular mimicry could be apparent after five days. Id. at 14. The opinions of the Secretary’s experts were more persuasive.

Dr. Whitton maintained that the nine steps needed for a molecular mimicry adverse reaction cannot happen in one day. He was especially dubious about two parts of the process. First, step v, which states that the memory T cells would need to divide before they could recruit the effector T cells, which attack the myelin. Second, even assuming that the immune system can be tricked into developing T cells that attack the myelin in the spinal cord, the blood brain barrier would necessarily impede this process so that the damage could not be apparent after only one day.

With regard to the amount of time needed for T cells to divide, Dr. Whitton was superbly qualified to express an opinion. Dr. Whitton’s professional life focuses on researching the immune system and how the immune system can cause disease. Exhibit M (curriculum vitae of Dr. Whitton). In that capacity, Dr. Whitton measured how quickly memory T cells take to divide. Dr. Whitton’s group reported that even memory T cells, which were thought to divide more quickly than effector T cells, take three days. Exhibit L, tab 31 (Jason K. Whitmire

¹² Dr. Poser’s first report did not address the temporal interval in any meaningful way. It stated “The very short latency of the neurological complications following the vaccination, 24 hours is unusual but does not negate the causal relationship.” Exhibit 22 at 3.

Dr. Poser’s second report discussed the timing in more detail. Exhibit 23 at 2-3. Dr. Poser’s opinions overlap with Dr. Steinman’s opinions.

et al., Tentative T Cells: Memory Cells Are Quick to Respond, But Slow to Divide, 4 PLoS Pathogens 1 (2008)); tr. 474-76 (Dr. Whitton).

Dr. Steinman acknowledged that Dr. Whitton's work is a "beautiful study . . . published in a great journal." However, Dr. Steinman attempted to distinguish this article as not informing what happens with human beings because Dr. Whitton's group experimented on rodents. Tr. 251-52 (Dr. Steinman). For reasons discussed in connection with the tuberculosis analogy (see section 4 below), rodent studies are informative.

The second part of the proposed sequence that Dr. Whitton found problematic concerns the blood brain barrier. The blood that circulates throughout the body is generally separated from the central nervous system.¹³ A series of junctions in the walls of the blood vessels prevents large molecules and cells from moving out of the blood into the brain. A purpose of this obstacle is to protect the brain from parts of the immune system that could, in theory, attack the brain. Tr. 305-06; tr. 349-50 (distinguishing small molecules that easily cross the blood brain barrier from large molecules that cannot cross the blood brain barrier easily).

The effectiveness of the blood brain barrier is demonstrated in old experiments recounted in an article submitted by Mr. Contreras after the April 20, 2010 hearing. The researchers gave human tubercle bacilli to guinea pigs with two methods of delivery. In one experiment, the researchers injected tuberculin directly into the animals' brains. All the guinea pigs died within 12 hours of the injection of tuberculin. In contrast, in another experiment, the tuberculin was given into the carotid artery, that is, outside of the blood brain barrier. In these animals, "there was no response elicited in the meninges of the hypersensitive animals." Exhibit 148 (Caspar G. Burn & Knox H. Finley, The Role of Hypersensitivity in the Production of Experimental Meningitis, 56(2) J. Experimental Med. 203 (1932)) at 217. To Dr. Whitton, this article shows that "merely administering antigen isn't sufficient. You have to breach the blood brain barrier." Tr. 630. Dr. Steinman recognized this portion of the article, but noted, as did the researchers, that is possible that there could have been a failure of technique. Tr. 678.

Dr. Steinman did not dispute that the blood brain barrier generally separates the central nervous system from the remainder of the body. Dr. Steinman

¹³ The central nervous system includes the brain and the spinal cord, which is the location of transverse myelitis. Tr. 226.

emphasized that the blood brain barrier is not absolute. Parts of the immune system, such as lymphocytes, regularly conduct immune surveillance within the brain. Dr. Steinman compared this to a cop walking a beat, looking for trouble. Thus, Dr. Steinman did not see the blood brain barrier as preventing molecular mimicry from happening within one day. Tr. 517-22; tr. 537-38.

Dr. Whitton readily accepted the point that immune surveillance happens all the time. In doing so, Dr. Whitton credited some of Dr. Steinman's research on this topic. Tr. 550-51. Dr. Whitton's testimony emphasized that an intact blood brain barrier permits T cells to enter the brain slowly. It is not just a question of whether T cells can cross a healthy blood brain barrier. It is a question of the rapidity by which T cells enter the brain in such a quantity that T cells can cause disease. See tr. 477-78; see also tr. 392 (Dr. Sladky stating that with immune surveillance, it takes "a long time" for T cells to cross the blood brain barrier); tr. 657-59 (Dr. Whitton's testimony that the blood brain barrier excludes not only cells but proteins).

Here, Dr. Steinman offered no persuasive response. T cells can cross the blood brain barrier but there is no reliable evidence that this entry into the central nervous system occurs so quickly that effector T cells can damage the myelin in the spinal cord within one day of the memory T cells encountering the inciting antigen.

Consequently, there is strong support for Dr. Sladky's opinion and Dr. Whitton's opinion that at least five days is needed for molecular mimicry. First, the Whitmire article shows that T cells, which are the part of the immune system involved in molecular mimicry, do not start to respond until three days. Second, a healthy blood-brain barrier delays the entry of T cells into the central nervous system, making a quick attack on the spinal nerves exceedingly unlikely.

3. Observations about Molecular Mimicry in Medical Articles

Reports from animal studies support opinions that a molecular mimicry process takes at least five days to cause damage. In several experiments, researchers induced neurologic disease through an immune-mediated process. In all these studies, the animals started showing signs of neurologic damage several days after their immune system was stimulated.

The most important article about the timing of molecular mimicry was exhibit 118 (F. Odoardi et al., Blood-borne Soluble Protein Antigen Intensifies

T Cell Activation in Autoimmune CNS Lesions and Exacerbates Clinical Disease, 104(47) PNAS 18625 (2007)). The witnesses discussed this article extensively because it was the only article to measure immune responses in hours. Thus, there is a lengthy analysis below (section a). In addition to the Odoardi article, five other articles contain some information about the amount of time for a molecular mimicry reaction to occur. These articles consistently report the time between the injection of an antigen to the manifestation of neurologic disease in days (section b).

These scientific experiments carry more evidentiary weight than the case report on which Mr. Contreras relies. Although Kakar describes an instance in which a girl developed a neurologic problem within one day of receiving a vaccine, an isolated report cannot exclude the possibility that the sequence was purely coincidental. Thus, for the reasons explained in section c, Kakar is not persuasive.

a) Odoardi

Dr. Steinman introduced the Odoardi article as part of his response to Dr. Whitton's report. To contradict Dr. Whitton's assertion that T cells take several days to cause damage, Dr. Steinman cited Odoardi as showing that autoreactive effector T cells became detectable in the brain within one hour of an antigen being injected. Exhibit 105 (Supp'l Rep't) at 7. In his testimony on direct examination about this article, Dr. Steinman essentially repeated his expert report. Tr. 175.

Dr. Whitton placed Dr. Steinman's discussion into context. Dr. Whitton explained that the effector T cells became active only after the blood brain barrier was breached, which was after 96 hours. Thus, Dr. Whitton indicated that this portion of Odoardi did not provide information about how long T cells would take to damage Mr. Contreras's brain because his blood brain barrier was intact. Tr. 480-82. Later, Dr. Whitton stated that Dr. Steinman did not understand the experiment correctly. Tr. 633. A review of the article shows that Dr. Whitton presented the Odoardi article accurately.

Dr. Odoardi and his colleagues intended to investigate how autoantigens affect the development of an autoimmune neurologic disease.¹⁴ The subjects of the

¹⁴ Dr. Odoardi and his colleagues work at the prestigious Max Planck Institute for Neurobiology. The senior participants in this study include Hartmann

experiment were Lewis rats and the autoimmune neurologic disease for these rodents is known as experimental autoimmune encephalitis (EAE). EAE is “a classic model reflecting inflammation in human multiple sclerosis,” exhibit 118 (Odoardi) at 18625, and Dr. Steinman has written about EAE many times, see, e.g., exhibit 112 (Lawrence Steinman, Blocking Adhesion Molecules as Therapy for Multiple Sclerosis: Natalizumab, 4 Nature Rev. 510 (2005)). According to Dr. Steinman, EAE is “very similar to acute transverse myelitis.” Exhibit 55 at 3; accord tr. 492 (Dr. Whitton).

Dr. Odoardi induced EAE in healthy Lewis rats by transferring 5 million T cells that were specific for myelin basic protein. Three days after the T cells were transferred, paralysis and weight loss started. The authors refer to this time as “p.t.,” meaning post transfer of the T cells designed to attack the rodents’ myelin. Exhibit 118 at 18625. The information showing the amount of time before neurologic problems were apparent is presented in figure 1.A. This shows that for 0 hours, 24 hours, and 48 hours after the T cells were transferred, the Lewis rats did not have any neurologic problems. At 72 hours, the Lewis rats scored one point on a clinical scale measuring degree of paralysis, meaning that their tails were limp. Exhibit 118 at 18626; see also tr. 635-36 (Dr. Whitton). Dr. Whitton interpreted this phase of the experiment as showing that when “you give an animal a large number of highly activated T-Cells specific for myelin to a healthy animal, it still takes three days [for disease to develop], and this is really fairly fast.” Tr. 641. Dr. Steinman essentially agreed with this summary of this portion of the experiment, although Dr. Steinman distinguished this experiment because it involved Lewis rats. Tr. 575; tr. 589; tr. 603-05.

In another part of this experiment, Dr. Odoardi “then infused soluble [myelin basic protein] later, during freshly established clinical EAE (days 4 or 5 p.t.), a stage when the majority of the autoaggressive T cells have left the peripheral immune organs through the bloodstream and invaded the CNS.”¹⁵ At this point, the introduction of the myelin basic protein caused significant aggravation of the clinical disease. Exhibit 118 at 18625. The worsening of the disease is apparent in figure 1.A because on days four and five, when the researchers re-introduced the

Wekerle and Alexander Flügel, who, according to Dr. Steinman, are leading neuroimmunologists. Tr. 604; accord tr. 636 (Dr. Whitton).

¹⁵ If the researchers administered 500 µg of myelin basic protein before the onset of EAE, that is one, two, or three days after the T cells were injected, EAE was prevented entirely. Exhibit 118 at 18625; see also tr. 637-38 (Dr. Whitton).

myelin basic protein, the Lewis rats scored two to four points on the clinical scale for paralysis.

Odoardi described what was happening in the second portion of the experiment. “This article explores the effect of soluble autoantigen in a later phase, when the effector [T] cells have moved from the spleen to the CNS, there forming the pathogenic infiltrates.” Exhibit 118 at 18628. Dr. Whitton commented “I can’t stress that strongly enough. . . . This is a diseased central nervous system, [in] which the blood brain barrier is wide open.” Tr. 660.

Using sophisticated imaging techniques, Odoardi monitored the T cells designed to attack myelin basic protein in rodents experiencing EAE. Within 60 minutes of the T cells being introduced, they were present in the central nervous system. Exhibit 118 at 18626-27. This is the portion of the article that Dr. Steinman cites. Exhibit 105 at 7.

However, Dr. Steinman seems to overlook the difference between rodents with EAE and rodents without EAE. Odoardi commented on how the presence of the disease (or its absence) affected an experiment with T cells that were sensitive to ovalbumin, known as DQ-OVA+ cells. “After i.v. infusion, DQ-OVA+ cells could not be detected in the noninflamed control CNS parenchyma, presumably because of a denied passage through the [blood brain barrier]. In contrast, during acute EAE (4 days p.t.) the compound was taken up and processed within 30 min by substantial numbers of CNS cells.” Exhibit 118 at 18627. For Dr. Whitton, this portion of Odoardi demonstrated that the blood brain barrier “is quite tight.” Tr. 659; accord tr. 633-34; tr. 660-61.

The conclusion of Odoardi and colleagues is consistent with distinguishing animals with a neurologic disease and animals without such a disease. They wrote: “we have shown here that during florid CNS inflammation, exogenous protein antigens readily reach the CNS lesions and are presented there to local infiltrating T lymphocytes.” Exhibit 118 at 18630. Dr. Whitton commented that the authors’ conclusion is that: “The CNS is inflamed, and the blood brain barrier is wide open. The doors are flung open. Of course antigen is going to enter the central nervous system. There is absolutely no surprise there.” Tr. 632.

Mr. Contreras has not presented any persuasive basis for finding that his blood brain barrier was “wide open” when he received his vaccinations. With a normal (intact) blood brain barrier, Mr. Contreras is comparable to the healthy rodents that received T cells designed to attack myelin basic protein. As depicted

in Figure 1.A. of Odoardi, the immune-mediated neurological consequence for Lewis rats is apparent only after 72 hours. Thus, Odoardi strongly supports the view that molecular mimicry cannot happen within one day. See tr. 642 (Dr. Whitton’s testimony that Odoardi and other articles “actually strengthen[] my convictions that this just can’t have happened in a healthy boy within 24 hours.”).

b) Additional Medical Articles

The advantage of Odoardi is that it explicitly measures the time necessary for an immune-mediated neurologic response in Lewis rats in hours. Although other medical articles show the response in days, they remain relevant to determining whether one day is a sufficient period. In the articles discussed below, the rodents did not manifest a neurologic problem for many days after the introduction of the antigen.

Lafaille. Dr. Steinman cited to this article in his original report. Dr. Steinman interpreted figure 1 of Lafaille as clearly demonstrating that “with recall responses to myelin molecules that the onset of clinical paralysis occurs in five days or less.” Exhibit 55 at 4.

In Lafaille, certain types of mice were given four types of T cells, all of which were responsive to myelin basic protein. Dr. Steinman explained that these mice were preprimed to respond to the antigen. Tr. 217. The mice developed experimental autoimmune encephalomyelitis (EAE), the same disease in Odoardi. Figure 1 shows the amount of time that passed as the animals’ EAE worsened. The first data point is presented at 5 days, although there is a sloped line, in some cases, connecting the zero point to the information at 5 days. Exhibit 77 (Juan J. Lafaille, Myelin Basic Protein-specific T Helper 2 (Th2) Cells Cause Experimental Autoimmune Encephalomyelitis in Immunodeficient Hosts Rather than Protect Them from the Disease, 186(2) J. Experimental Med. 307 (1997)) at 309.

When asked on cross-examination when these mice developed disease, Dr. Steinman stated “the first actual data point shows that animals were getting sick somewhere a little before day 5, somewhere in the 96- to 120-hour period.” Tr. 218. Dr. Steinman also interpreted figure 1 with the sloped line starting at 0 days before the data point at 5 days as significant. To Dr. Steinman, “if you connect the dots, you’ll see that somewhere after time zero, probably around 24 hours, the animals are sick.” Id. Dr. Steinman, however, recognized that he does not know whether the authors observed the animals at 24 hours. Id. at 218-19.

Dr. Whitton disagreed. He stated that the article does not present any information showing that the animals were beginning to have a disease within 24 hours. Tr. 426.

Zamvil. Dr. Steinman cited to Zamvil as showing how he (Dr. Steinman) has studied “the similarities between experimental autoimmune encephalitis and inflammatory diseases of the central and peripheral nervous system extensively.” Exhibit 55 at 3. (Dr. Steinman’s name appears last among the authors of the Zamvil article.)

The basic experiment was the same in that the mice were given T cells to induce paralysis. The quickest time for the mice to show neurologic damage was 14 days.¹⁶ Exhibit 67 (Scott Zamvil et al., T-cell Clones Specific for Myelin Basic Protein Induce Chronic Relapsing Paralysis and Demyelination, 317 Nature 355 (1985)) at 356; accord tr. 426 (Dr. Whitton). Dr. Steinman agreed that the damage started in 10-14 days but the experiment was conducted about 25 years earlier. According to Dr. Steinman, with modern methods, EAE can be produced more quickly. Tr. 242-43.

Mensah-Brown. Dr. Sladky cited this article to show that “[e]ven using an optimized immune stimulus in the laboratory, a 24 hour interval between immune challenge and symptoms of demyelinating disease does not occur.” Exhibit I (Dr. Sladky’s October 21, 2005 report) at 5. In Mensah-Brown, the clinical disease began 11 days after being injected with a substance containing tissue from a rat’s spinal cord. Exhibit D (E.P.K. Mensah-Brown et al., Neuroglial Response After Induction of Experimental Allergic Encephalomyelitis in Susceptible and Resistant Rat Strains, 233 Cellular Immunology 140 (2005)); accord tr. 250 (Dr. Steinman).

Mekala. Again, mice were injected with myelin basic protein and developed neurological problems, which were scored using the standard scale. Here, the first indications of disease appeared on day 10. Exhibit K (Divya J. Mekala et al., IL-10-dependent Infectious Tolerance After the Treatment of Experimental Allergic Encephalomyelitis with Redirected CD4+CD25+ T Lymphocytes, 102(33) PNAS 11817 (2005)).

Ufret-Vincentry. Here, mice susceptible to developing an autoimmune problem in their central nervous system were given a portion of the Epstein Barr

¹⁶ Dr. Steinman pointed out that the graph in his paper used a step-line in that days zero to 13 show no neurologic damage. Tr. 222-23.

virus and developed EAE. The amount of time that passed was at least five days. Exhibit 145 (Rafael L. Ufret-Vincentry, In Vivo Survival of Viral Antigen-specific T Cells that Induce Experimental Autoimmune Encephalomyelitis, 188 (9) J. Experimental Med. 1725 (1998)) at 1731 (fig. 2); see also tr. 524 (Dr. Steinman).

c) **Kakar Case Report**

Against these articles, Mr. Contreras offers a case report, authored by Atul Kakar. Exhibit 72 (Atul Kakar & P.K. Sethi, Guillain Barre Syndrome Associated with Hepatitis B Vaccination, 64(5) Indian J. Pediatrics 710 (1997)). In this article, the authors present a case in which a three-year-old girl received a dose of the hepatitis B vaccine and developed weakness in both lower limbs the next day. Her clinical presentation resembled Guillain-Barré syndrome.

The authors present “two explanations.” “[F]irstly, the patient had been already primed by the antigen and the features were triggered by vaccine; secondly, GBS was unrelated to the vaccine and was caused by a virus in the body.” Exhibit 72 (Kakar) at 711 (footnote omitted).¹⁷ In a nutshell, the Kakar case report is like Mr. Contreras’s case.

Dr. Steinman stated that the Kakar article shows an example “has happened somewhere in the world. . . . [Thus,] it means that you have to elevate the argument to a little higher plain than just saying that it could happen.” Tr. 195. Mr. Contreras presents a similar argument. Pet’r Br. at 30.

Dr. Sladky and Dr. Whitton ascribed little value to a case report. Dr. Sladky explained that medical scientists try to use epidemiology in attempting to determine causal relationships because epidemiology has the advantage of eliminating bias. Case reports, in contrast, have several levels of bias. According to Dr. Sladky, it would be wrong to assume that the Kakar article presents a causal connection between the hepatitis B vaccine and the girl’s Guillain-Barré syndrome. Tr. 295-98.¹⁸

¹⁷ “Priming” is discussed in section 4.

¹⁸ Although Dr. Sladky contrasts the value of case reports with the value of epidemiologic studies, the undersigned is not requiring Mr. Contreras to present an epidemiologic study. See Althen, 418 F.3d at 1280. The parties have presented various epidemiologic studies that could be useful in determining the first prong of Althen. See Andreu v. Sec’y of Health & Human Servs., 569 F.3d 1367, 1379

Dr. Whitton stated that he gives “[i]solated case reports very little weight.” Tr. 430. Specifically, with regard to Kakar, Dr. Whitton stated that “there’s no evidence whatsoever that the case report that came from India has a cause-effect relationship between the vaccination and the GBS that developed one day later.” Tr. 431.

Judicial officers in the Vaccine Program have treated case reports variably. In some circumstances, case reports are found meaningful. “Case reports do not purport to establish causation definitely, and this deficiency does indeed reduce their evidentiary value compared particularly to formal epidemiological studies. Nonetheless, the fact that case reports can by their nature only present indicia of causation does not deprive them of all evidentiary weight.” Campbell v. Sec’y of Health & Human Servs., 97 Fed. Cl. 650, 668 (2011), citing Rotoli v. Sec’y of Health & Human Servs., 89 Fed. Cl. 71, 86-87 (2009). Case reports have been found to be useful in assisting a petitioner in establishing causation by a preponderance of the evidence. E.g. Roper v. Sec’y of Health & Human Servs., No. 00-407V, 2005 WL 3597255, at *5 (Fed. Cl. Spec. Mstr. Dec. 9, 2005); see also Stevens v. Sec’y of Health & Human Servs., No. 99-524V, 2006 WL 659525, at *22-24 (Fed. Cl. Spec. Mstr. Feb. 24, 2006).

On the other hand, the undersigned has cited precedents from outside of the Vaccine Program that rejected case reports as evidence of causation. Porter v. Sec’y of Health & Human Servs., No. 99-639, 2008 WL 4483740, at *13 (Fed. Cl. Spec. Mstr. Oct. 2, 2008) (citing McClain v. Metabolife Int’l, Inc., 401 F.3d 1233, 1253 (11th Cir. 2005)); Meister v. Med. Eng’g Corp., 267 F.3d 1123, 1129 (D.C. Cir. 2001); Glastetter v. Novartis Pharm. Corp., 252 F.3d 986, 989-90 (8th Cir. 2001)). When this case reached the Federal Circuit, the Federal Circuit noted that “[t]he special master found that the remaining two articles, both describing single case studies, did not contain any meaningful analysis about causation.” Porter v. Sec’y of Health & Human Servs., 663 F.3d 1242, 1253 (Fed. Cir. 2011). The Federal Circuit stated that the “decision reveals a thorough and careful evaluation of all the evidence including . . . medical literature.” Id. at 1254. Thus, under the Federal Circuit’s standard of review in which it did not reweigh factual findings, it affirmed the special master’s decision.

(Fed. Cir. 2009). However, this decision does not reach any finding regarding Mr. Contreras’s evidence that the hepatitis B vaccine can cause transverse myelitis as a general proposition and, for that reason, this decision does not discuss the epidemiological evidence.

Even if a case report could carry some evidentiary weight in the Vaccine Program (see Campbell), this particular case report holds relatively little value. Controlled experiments, such as the ones reported in Odoardi, present a strong reason for finding that Kakar represents a coincidence. Dr. Steinman did not present any persuasive reason for treating Kakar as a valuable piece of supporting evidence. Therefore, the Kakar case report offers only minimal assistance to Mr. Contreras.

d) Summary Regarding Medical Articles

Although some experiments report different times, none of them suggested that 24 hours is appropriate for an otherwise healthy individual. The amount of time included three days (Odoardi), 14 days (Zamvil), 11 days (Mensah-Brown), 10 days (Mekala), and at least five days (Ufret-Vincentry). These articles form a basis for Dr. Whitton's testimony and Dr. Sladky's testimony that a molecular-mimicry mediated adverse reaction to a vaccine requires the passage of several days. None of the articles reported experiments showing rodents developing neurological disease in one day. See tr. 214 (Dr. Steinman). Dr. Steinman acknowledged that his laboratory has never induced EAE in animals in 24 hours. Tr. 214.

Collectively, this material supports a finding that the minimum amount of time for an autoimmune reaction to cause neurological damage via molecular mimicry exceeds one day. If this material were all the evidence of record, then Mr. Contreras would not have met his burden of proof. Mr. Contreras, however, introduced other evidence to support his argument that one day is an appropriate medical interval between the vaccination and the onset of neurological symptoms. This material is discussed in the next two sections.

4. Petitioner's Explanation That Molecular Mimicry Can Occur in One Day

With assistance from Dr. Steinman, Mr. Contreras contends that the foregoing material does not establish an absolute minimum amount of time. Mr. Contreras maintains that it is biologically plausible for a vaccine to trigger an immune-mediated reaction that causes signs of neurologic dysfunction 25 hours

later. Mr. Contreras supports his theory with two points. These are (a) an analogy to a tuberculin response and (b) an argument based upon repeat dose. Tr. 582.¹⁹

a) Tuberculin Response

In his initial expert report, Dr. Steinman stated that “the Hepatitis B vaccine could have rapidly triggered acute transverse myelitis . . . in a time period of 24-72 hours, just as a tuberculin reaction can be elicited within 24-72 hours in a patient already sensitized to mycobacteria tuberculosis.” Exhibit 55 at 3. Dr. Steinman maintained this opinion throughout his testimony in April 2010. *E.g.*, tr. 208, 210. Often, Dr. Steinman emphasized that the amount of time human beings take to respond to tuberculin is a sound basis for determining how much time a human being would take to develop transverse myelitis as an adverse reaction to the hepatitis B vaccine. To Dr. Steinman, studies such as Odoardi and others discussed above are less informative because those articles reported experiments on rodents, not people. Tr. 248; tr. 266-67.

In contrast, the Secretary’s experts stated that a human being’s response to tuberculin was different from the theory offered by Dr. Steinman to explain how the hepatitis B vaccine can cause transverse myelitis. The basic difference, according to Dr. Sladky and Dr. Whitton, is that transverse myelitis occurs in the spinal cord and a tuberculin reaction appears on a person’s skin. Tr. 308-09; tr. 391-93 (Dr. Sladky); tr. 415-19 (Dr. Whitton).

When a person is exposed to bacteria that cause tuberculosis, the person develops T cells. Doctors test for exposure by administering tuberculin under the person’s skin. If the person was previously exposed to tuberculosis, the skin will become hard and red. Tr. 141; see also tr. 303-04 (Dr. Sladky).

There was extensive testimony about the amount of time that should pass before the skin is examined for hardness and redness. Dr. Steinman stated that the test can be read “as early as 24 hours.” Tr. 141. Dr. Sladky testified that “usually, one reads a tuberculin test in 48 to 72 hours.” Tr. 304. Dr. Whitton stated that after 24 hours, swelling could be apparent and, if so, the swelling would probably

¹⁹ Very briefly, Dr. Steinman also discussed a possible contribution by the adjuvant contained in the hepatitis B vaccine, alum. Tr. 621. This did not appear to be anything more than an afterthought. In any event, Dr. Whitton persuasively explained why alum could not cause Mr. Contreras to develop a reaction in one day as proposed by Dr. Steinman. Tr. 654-55.

indicate exposure to tuberculin. However, a lack of swelling at 24 hours does not allow the doctors to conclude that the patient was not exposed to tuberculin. The patient should be examined again after 48 hours. Tr. 477; tr. 647. The possibility that a tuberculin test could be positive after 24 hours, as acknowledged by Dr. Whitton, is some slight evidence in Mr. Contreras's favor.

However, overall, Dr. Steinman was not persuasive when he attempted to analogize between a reaction to tuberculin and an adverse reaction to a vaccine in the form of transverse myelitis. Dr. Steinman did not counter three points. First, the tuberculin test must be given intradermally, where important antigen-presenting cells are located. Tr. 679-80 (Dr. Steinman); see also tr. 391-93 (noting the skin is an optimal organ to show an immune-mediated reaction). The hepatitis B vaccine, however, is administered subcutaneously and there is no evidence that the subcutaneous tissue contains similar immune cells. Second, the tuberculin reaction is apparent where the tuberculin is injected, typically the person's arm. The target area is different for transverse myelitis in which the (alleged) reaction takes place in the spinal cord. Third, and most importantly, the tuberculin reaction occurs in an area not protected by the blood brain barrier. Dr. Whitton consistently explained that the blood brain barrier would prevent the quick passage of the immune cells that could damage the myelin. Tr. 418. All these points contribute to a finding that Dr. Steinman lacked persuasiveness when he relied upon tuberculin as a model for transverse myelitis.

Dr. Steinman's analogy was undercut further as more information about how rodents respond to something like tuberculin was presented. At the end of the April 20, 2010 hearing, Dr. Whitton testified that when mice are injected with a substance designed to produce a delayed type hypersensitivity reaction, the mice will show "foot pad swelling" within 24 hours after injection.²⁰ Tr. 549-51. After this testimony, the Secretary submitted articles confirming Dr. Whitton's testimony regarding the amount of time needed for mice to exhibit foot pad swelling. Exhibit Z (Shin-Ichi Tamura et al., Cellular and Humoral Immune Responses in Mice, 26 Japan J. Med. Sci. Biol. 161 (1973)); exhibit AA (Yi Luo & Martin E. Dorf, Delayed-Type Hypersensitivity, Current Protocols in Immunology 4.5.1-4.5.5 (1993)). Dr. Steinman, subsequently, agreed with those articles. Tr. 586-87.

Overall, the analogy to tuberculin tends to favor the Secretary's position. Both rodents and humans can display the effects of a delayed type hypersensitivity

²⁰ The transcript erroneously contains the phrase "fruit bat swelling" in lieu of "foot pad swelling."

reaction to a substance injected into the skin within approximately 24 hours. The similarity in time shows that there is some equivalence between the immune system of rodents and the immune system of humans. See tr. 475-76; tr. 626. Odoardi and other researchers show that the process of developing an injury within a rodent's central nervous system takes several days. Thus, it seems fair to conclude, as Dr. Whitton and Dr. Sladky have done, that this process in human beings would also take several days.

b) Priming

Mr. Contreras's second point offered to show that an immune-mediated reaction can cause transverse myelitis in one day is that his prior two hepatitis B vaccinations sensitized or primed his immune system. Mr. Contreras argues: "Subsequent immunization with Hepatitis B vaccine then elicited a recall response to myelin. It makes the immune response more sensitive effectively priming the system for a fast response when the same or similar sequence is encountered." Pet'r Br. at 18; accord Pet'r Supp'l Br. at 8.

There was relatively little evidence about whether previous doses of a vaccination make a recipient more likely to develop an adverse response within one day. Most of the testimonial evidence came from the July 28, 2011 hearing, when Dr. Steinman frequently insisted that Mr. Contreras's earlier exposures to the hepatitis B vaccine made him comparable to the diseased rodents from the Odoardi experiment that had T cells in their brains within one hour of being injected with myelin basic protein.²¹ E.g., tr. 599; tr. 604; tr. 618; tr. 673-74; see also tr. 161; tr. 577-80 (testimony from the April 19, 2010 hearing). Dr. Steinman also stated that when there is sensitization, the adverse reaction occurs very quickly. Tr. 612-13.

However, Dr. Whitton opposed Dr. Steinman's opinion. Dr. Whitton stated that he did not see why Mr. Contreras's previous exposure to the hepatitis B vaccine would make him more likely to develop a disease in his central nervous system. Tr. 461; tr. 646.

²¹ Dr. Steinman's analogy to the Odoardi rodents in this context seems inconsistent with his testimony that the rodents in other experiments such as Lafaille, which showed an onset of EAE in approximately four to five days, did not provide useful information about human beings. Tr. 576; see also tr. 217-218.

In effect, the record contains the opinion of two extremely qualified doctors presenting opposite opinions regarding the effect, if any, of prior doses. Neither party has cited any studies about priming. Thus, the undersigned must weigh the relative value of the experts' testimony and accept Mr. Contreras's evidence when it weighs even slightly in his favor. Moberly v. Sec'y of Health & Human Servs., 592 F.3d 1315, 1325-26 (Fed. Cir. 2010); Althen, 418 F.3d at 1280-81.

Dr. Steinman's reasoning is difficult to accept. Dr. Steinman is saying that although rodents may need days to develop an immune-mediated adverse reaction in their central nervous system, Mr. Contreras can develop the same type of reaction in only one day because he was different from the rodents. Mr. Contreras, according to this portion of Dr. Steinman's presentation, was "primed."

The flaw in Dr. Steinman's reasoning is the implicit assumption that the rodents were "normal." Actually, the rodents in these experiments are genetically designed to develop the adverse reaction. There is no dispute that these rodents are "primed."

Dr. Steinman explained how the animals are prepared. With reference to Lafaille, in which the animals showed neurologic disease four to five days after the introduction of an antigen, Dr. Steinman stated

They [the Lafaille researchers] took mice and they made animals that every single T cell in their whole body was able to recognize one of those peptides from myelin basic protein. And then they polarized them either to make a lot of gamma interferon or to make a Th2 cytokine probably [IL-4]. Then they put them into immune deficient animals so that the recipient animal would have no T cells of its own, and they asked could both the Th1 and/or the Th2 type of T cell cause EAE.

Tr. 217. When asked whether these animals were "preprimed," Dr. Steinman responded "Definitely." Later, Dr. Steinman characterized the animal studies as "very contrived experiments." Tr. 525.

Dr. Whitton agreed that the animals were manipulated. He stated that "[t]he deck has been stacked in order to investigate a scientific possibility." In his opinion, the laboratory conditions are "optimized" to show a response. Tr. 424-25.

As discussed above, when these primed rodents developed an adverse reaction, the interval was several days. Thus, even if Mr. Contreras were assumed to be primed for a reaction, the likely amount of time would still be measured in days. Dr. Steinman has not presented persuasive reasons for finding, on a more likely than not basis, that Mr. Contreras would react faster than rodents that are programmed to have an adverse reaction.

5. Treating Doctors

The Federal Circuit has instructed special masters to consider carefully the views of treating doctors about whether a petitioner has presented “‘a logical sequence of cause and effect show[ing] that the vaccination was the reason for the injury.’” Capizzano, 440 F.3d at 1326, quoting Althen, 418 F.3d at 1280. Although this portion of Capizzano refers specifically to the second factor in Althen, in an effort to weigh all evidence potentially helpful to Mr. Contreras, the undersigned will review the statements of Mr. Contreras’s treating physicians to see whether they provide information relevant to the third prong of Althen. In this regard, Mr. Contreras advances the statements of Dr. Kyazze, Dr. Wagner, and Dr. Garrett. Pet’r Brief, filed Aug. 23, 2010, at 23-25.

a) Dr. Kyazze

Dr. Kyazze conducted a physical examination on Mr. Contreras and administered the vaccinations to him on June 16, 2003. Exhibit 4 at 44. Dr. Kyazze completed a form, notifying the Vaccine Adverse Events Reporting Service that Mr. Contreras developed transverse myelitis after the vaccinations. Exhibit 4 at 44; see also exhibit 11 at 2, ¶ 7.

At the hearing, Dr. Kyazze testified that he submitted the VAERS report because state law required him to make that report. Tr. 56. When Mr. Contreras’s attorney asked whether Dr. Kyazze held the belief that Mr. Contreras experienced an adverse reaction to the vaccine, Dr. Kyazze responded “No.” Id. In response to questioning by the Secretary’s attorney, Dr. Kyazze stated that he would not know whether the vaccine caused Mr. Contreras’s illness. Tr. 60.

b) Dr. Wagner

Dr. Wagner cared for Mr. Contreras in the emergency room at the first hospital (Memorial Hospital of Gardena) and arranged his transfer to the second hospital (Miller’s Children Hospital). In his May 13, 2005 affidavit, Dr. Wagner

stated “The proximity in time to the immunization made the DT and the Hepatitis B vaccine a suspected cause. I was not able to find any other reason or condition based on the medical history and upon my examination of [Mr. Contreras] which could have caused this reaction.” Exhibit 12 ¶ 6.

At the hearing, Dr. Wagner elaborated upon his views. He based his testimony upon a review of his treatment records, Dr. Garrett’s report, and Dr. Steinman’s report and references. Tr. 92. Dr. Wagner did not review the reports of Dr. Sladky or Dr. Whitton. Tr. 97-98.

Dr. Wagner’s opinion carries relatively little weight. His affidavit essentially reasons that he ruled out other potential causes of Mr. Contreras’s condition, leaving only the vaccines as the potential cause. The Federal Circuit, however, has rejected such reasoning. Moberly, 592 F.3d at 1323. To the extent that Dr. Wagner’s hearing testimony endorses Dr. Steinman’s opinion, Dr. Wagner’s conclusion is only as strong as Dr. Steinman’s opinion is probative. For the reasons explained above, Dr. Steinman’s opinion is not persuasive. Moreover, Dr. Wagner did not undertake a dispassionate consideration of the material in this case because he did not review the opinions contrary to Dr. Steinman. Thus, Dr. Wagner falls short of being persuasive.

c) Dr. Garrett

Dr. Garrett treated Mr. Contreras while he was in the pediatric intensive care unit of Miller’s Children’s Hospital. He presented two affidavits, exhibit 13 (signed June 7, 2005) and exhibit 147 (signed April 16, 2010). The second affidavit confirms what Dr. Garrett said in the first affidavit.

Dr. Garrett’s 2005 affidavit evidences careful consideration of Mr. Contreras’s situation. Dr. Garrett set forth his background as a doctor specializing in pediatrics with specific training in pediatric critical care medicine. Paragraph 1. He described Mr. Contreras’s medical history. Paragraphs 2-12. He explained why he thinks that vaccines can cause transverse myelitis by citing medical articles, mostly case reports. Paragraphs 13-15. Dr. Garrett concluded that vaccines can cause transverse myelitis, the injury occurred in a medically appropriate time, and all other probable alternative causes were excluded. Paragraph 16. Ultimately, Dr. Garrett opined “It is more likely than not that the vaccine was a substantial factor in causing or significantly contributing to the development of cervical transverse myelitis in this previously healthy young boy.” Paragraph 17 (emphasis removed).

A relative weakness in Dr. Garrett's affidavit is the absence of any meaningful explanation of why a one-day interval is medically appropriate. Relying upon an article by Dr. Poser, which was submitted as exhibit 21,²² Dr. Garrett states "as a general rule postvaccinal complications develop between one and six weeks after vaccination, although this period can be as short as 12-24 hours." Paragraph 15.

Although there was no testimony about exhibit 21 during the hearing, the undersigned has reviewed this article in the context of weighing Dr. Garrett's affidavit because "[a]n expert opinion is no better than the soundness of the reasons supporting it." Perreira v. Sec'y of Health & Human Servs., 33 F.3d 1375, 1377 n.6 (Fed. Cir. 1994). Three points in Dr. Poser's article are readily apparent. First, the article was published in 1987. It predates all but one of the articles presenting experiments based upon experimental autoimmune encephalitis, discussed in section III.B.3. above. Second, the article does not cite any studies to support the assertion that a postvaccinal complication can develop within 24 hours. Third, the statement is very general in that it does not distinguish among different types of reactions. For example, an anaphylactic reaction is expected to occur within 4 hours. However, the minimum amount of time needed for a vaccine containing an attenuated measles virus to cause thrombocytopenic purpura is seven days. 42 C.F.R. § 100.3 (paragraphs I.A & V.A).

In Mr. Contreras's case, the specific type of reaction offered by Dr. Steinman is one mediated through the immune system via molecular mimicry. As discussed at length by Dr. Sladky and Dr. Whitton, transverse myelitis occurs inside the blood brain barrier and this protection necessarily increases the amount of time that must elapse before any neurological damage caused by the immune system becomes apparent. Neither Dr. Poser's article nor Dr. Garrett's affidavit address the blood brain barrier.²³ Dr. Garrett's opinion, which was clearly presented in good faith, does not overcome the persuasive testimony of Dr. Sladky and Dr. Whitton.

²² The full citation for exhibit 21 is Charles M. Poser, "Neurologic syndromes that arise unpredictably" Consultant (Jan. 1987) 45.

²³ As mentioned previously, Dr. Poser wrote two affidavits for Mr. Contreras. Exhibits 22-23. The analysis of Dr. Poser's opinions is subsumed by the analysis of Dr. Steinman's opinions. See footnote 12, above.

6. Synopsis on Timing

Mr. Contreras must establish that his transverse myelitis arose within an interval after the vaccination that is “medically appropriate.” Althen, 418 F.3d at 1278. Here, significant evidence was presented regarding whether the medical community would accept one day as being a basis for inferring that the hepatitis B vaccine caused the transverse myelitis.

The administration of the hepatitis B vaccine only one day before the onset of Mr. Contreras’s transverse myelitis makes suspecting the vaccination as a potential cause relatively easy. However, the science does not support this quick conclusion. The Secretary’s position is that one day is “simply not plausible,” Resp’t Br. at 25, and the evidence supports this conclusion. The testimony of Dr. Sladky and Dr. Whitton was consistent with medical literature that shows that, at a minimum, the blood brain barrier would prevent an immune-mediated reaction in the spinal cord in one day. Dr. Whitton did not see this case as being one that falls within a shade of grey. For Dr. Whitton, “24 hours is well into the black.” Tr. 478. His opinion is that “there is no credible hypothesis that would explain a 24-hour timeframe, which would tie a vaccine causally to the induction of such a profound central nervous system disease.” Tr. 451. Dr. Sladky shared this perspective. He stated that the shortest amount of time would be seven to ten days. Tr. 329. Despite able assistance from counsel and Dr. Steinman, Mr. Contreras did not counter this evidence persuasively.

The finding that Mr. Contreras’s transverse myelitis developed too quickly after the hepatitis B vaccination for the vaccine to have caused the disease makes this case comparable to Bazan. There, the petitioner alleged that the tetanus-diphtheria vaccine caused her to develop another neurological disorder (acute disseminated encephalomyelitis) within 11 hours of receiving the vaccination. The special master found that the interval was not medically appropriate, Bazan v. Sec’y of Health & Human Servs., No. 03-620V, 2006 WL 5616947, at *6-8 (Fed. Cl. Spec. Mstr. Feb. 7, 2007), and the Federal Circuit affirmed this fact-finding, Bazan v. Sec’y of Health & Human Servs., 539 F.3d 1347, 1353-54 (Fed. Cir. 2008).²⁴

²⁴ Mr. Contreras is also similar to another recently decided case. There, Robert Veryzer alleged that the hepatitis A vaccine caused him to suffer “physical, cognitive and emotional symptoms within hours of receiving the vaccination.” Veryzer v. Sec’y of Health & Human Servs., No. 06-522V, 2011 WL 1935813, at *8 (Fed. Cl. Spec. Mstr. April 29, 2011) (summarizing petitioner’s affidavit). The

IV. Conclusion

For these reasons, Mr. Contreras has not established one element of his proof. He is not entitled to compensation. The Clerk's Office is instructed to enter judgment in accord with this decision unless a motion for review is filed.

IT IS SO ORDERED.

Christian J. Moran
Special Master

special master reviewed cases and concluded that “petitioner’s theory of demyelination with onset within a few hours of receipt of the Hepatitis A vaccine appears too soon to be causally related to the vaccination.” Id. at *24. Upon review, the Court found that the special master’s finding that the petitioner did not establish an appropriate temporal relationship was not arbitrary or capricious. Veryzer, 100 Fed. Cl. at 356.