IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ENDO PHARMACEUTICALS INC., Plaintiff, v. MYLAN PHARMACEUTICALS INC., et al., Defendants.	Civil No. 11-CV-00717 (RMB/KW) OPINION

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BUMB, United States District Judge:

INTRODUCTION

This is an action for patent infringement brought by Plaintiff Endo Pharmaceuticals Inc. ("Endo" or "Plaintiff") against Defendants Mylan Pharmaceuticals Inc. and Mylan, Inc. (collectively, "Mylan" or "Defendants") pursuant to 35 U.S.C. § 271(e)(2)(A), and §§ 271(a), (b), and (c). Specifically, Endo alleges that Mylan has infringed and/or will infringe U.S. Patent Nos. 5,464,864 (filed Nov. 7, 1995) (the "'864 Patent"), 5,637,611 (filed June 10, 1997) (the "'611 Patent"), and 5,827,871 (filed Oct. 27, 1998) (the "'871 Patent") (collectively, the "King Patents") in connection with Mylan's submission of Abbreviated New Drug Application ("ANDA") number 202931 seeking the approval of the U.S. Food & Drug Administration ("FDA") to market its generic ANDA Product prior to the expiration of the King Patents.

On July 18, 2013, the Honorable Joseph E. Irenas held a hearing pursuant to Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996), and subsequently issued a claim construction opinion addressing three disputed claim terms of the King Patents (the "Claim Construction Opinion"). (Dkt. Ent. 167.) Although Mylan disputes the claim construction adopted by the Court, it conceded prior to trial that, under the Court's claim construction, Mylan infringes or will infringe the asserted claims of the King Patents. (Notice of Concession of Infringement, Dkt. Ent. 182.) However, Mylan maintained that the King Patents are invalid under the doctrines of anticipation, obviousness, written description, and enablement. The Court held a bench trial from November 12 through November 21, 2013, after which it permitted the parties to submit proposed findings of fact and conclusions of law.[1]

After consideration of the evidence and the parties' post-trial submissions, and for the reasons set forth below, the Court finds that (1) Endo has waived and is now judicially estopped here from pursuing claims against Mylan related to the

[1] Mylan subsequently filed a letter requesting that the Court strike certain portions of Endo's opening brief and proposed findings of fact, which included inter alia certain irrelevant or confidential information. (See Dkt. Ent. 201.) Mylan's request is moot in light of the decision set forth herein and for the further reason that Endo's materials were filed under seal.

‘871 and ‘611 Patents in this litigation, and (2) the asserted claims of the ‘864 Patent are valid. Accordingly, the Court enters judgment against Mylan and in favor of Endo. This Opinion constitutes the Court’s findings of fact and conclusions of law pursuant to Federal Rule of Civil Procedure 52(a).[2]

I. BACKGROUND

A. The Drug Approval Process

Under the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 301 et seq., the FDA must approve all new drugs before they may be distributed in interstate commerce. 21 U.S.C. § 355(a). To secure approval for a new drug, an applicant may file a New Drug Application (“NDA”) that includes, inter alia, the number and expiration date of any patents which claim the drug or a method of using the drug if a claim of patent infringement could reasonably be asserted. Id. § 355(b)(2). “The FDA publishes the names of approved drugs and their associated patent information in the Approved Drug Products with Therapeutic Equivalence Evaluations list, commonly referred to as the ‘Orange Book.’” AstraZeneca LP v. Apotex, Inc., 633 F.3d 1042, 1045 (Fed. Cir. 2010). An applicant seeking approval to market a generic version

[2] Endo’s oral motion made during trial, for judgment on partial findings pursuant to Rule 52(c), is DISMISSED as moot. Rule 52(c) permits such motions after “a party has been fully heard on an issue during a nonjury trial.” As permitted under the rule, the Court exercised its discretion to reserve on the motion when it was made during trial. (Tr. 1176:11-12.)

of a drug that has already been approved may file an ANDA, which "allows an applicant to rely on the safety and efficacy information for the listed drug if the applicant can show that the generic drug is 'bioequivalent' to the listed drug." Id. (citing 21 U.S.C. § 355(b)(2), (j)).

"[F]or each patent listed in the Orange Book that claims either the listed drug or a use of the listed drug for which the applicant is requesting approval, an ANDA must include either one of four certifications or a 'section viii statement.'" AstraZeneca LP, 633 F.3d at 1046. If an applicant submits a certification, the applicant must certify "(I) that . . . patent information has not been filed, (II) that such patent has expired, (III) . . . the date on which such patent will expire, or (IV) that such patent is invalid or will not be infringed by the manufacture, use, or sale of the new drug." 21 U.S.C. § 355(j)(2)(A)(vii)(I)-(IV). The last of these is known as a "paragraph IV certification". If an ANDA applicant submits a paragraph IV certification and a patent infringement suit is commenced within 45 days, then the FDA may not approve the ANDA application until expiration of a 30-month statutory period. Id. § 355(c)(3)(C).

B. Frova

On November 8, 2001, the FDA approved NDA No. 21-006 for Frova (frovatriptan succinate) oral tablets. (Stipulated Facts

("SF"), Dkt. Ent. 172 ¶ 8.) Frova is indicated for the acute treatment of migraine attacks with or without aura in adults. (Id. ¶ 10; see also John Campbell ("Campbell") Tr. 29:8-20, 29:25-30:10.)[3] Physicians also prescribe Frova "off-label" for the treatment of menstrual migraine.[4] (Dr. Brian Grosberg ("Grosberg") Tr. 1374:12-1376:2; see also Campbell Tr. 46:22-47:6.) The Orange Book associates the King Patents with frovatriptan succinate.[5] (Answer, Dkt. Ent. 9 ¶ 36.)

Endo commercially markets Frova, which contains a compound chemically designated as (R)-(+)-3-methylamino-6-carboxamido-1,2,3,4-tetrahydrocarbazole monosuccinate monohydrate, known as frovatriptan monosuccinate monohydrate, as the active pharmaceutical ingredient ("API"). (SF ¶ 5; Dr. Vincent Rocco ("Rocco") Tr. 126:8-10; see also Dr. Graham Johnson ("Johnson") Tr. 1024:4-6.) The label for Frova refers to the API as

[3] "Tr." refers to the trial transcripts, and is preceded by the name of the testifying witness.

[4] An "off-label" use means a use beyond those specifically approved of by the FDA. (Grosberg Tr. 1375:19-1376:2; Campbell Tr. 46:22-47:6.)

[5] The Orange Book also lists U.S. Patent Nos. 5,616,603 (the "'603 Patent") (DTX-1399) and 5,962,501 (the "'501 Patent") (collectively, the "Borrett Patents"). (Plaintiff's Answer to the Counterclaims of Defendants ("Answer to Counterclaims"), Dkt. Ent. 17 ¶ 9.) However, the parties entered into a covenant-not-to-sue with respect to these patents. (Stipulation of Dismissal, Dkt. Ent. 18 (stipulating to dismissal of counterclaim related to these patents).)

frovatriptan succinate. (Rocco Tr. 125:8-10; Campbell Tr. 28:10-12; PX-0008; PX-0009; PX-0059.)

The empirical formula for frovatriptan monosuccinate monohydrate is $C_{14}H_{17}N_3O \cdot C_4H_6O_4 \cdot H_2O$, and it has a molecular weight of 379.4. (SF ¶ 6; PX-0008; PX-0059.) Frova tablets contain 3.91 mg frovatriptan monosuccinate monohydrate, equivalent to 2.5 mg of frovatriptan free base. (SF ¶ 9; PX-0008; PX-0009.) This difference in weight is accounted for by the weight of the succinate and water molecules added to the free base. (Rocco Tr. 128:3-15.)

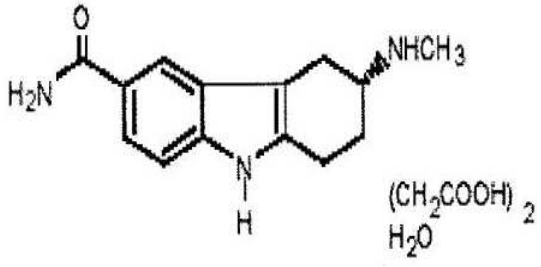
Chemical compounds may exist in a variety of forms, including free base forms, salts, solvates, hydrates, salt-hydrates, and salt-solvates. Frovatriptan monosuccinate monohydrate is a hydrated salt form of frovatriptan. (Rocco Tr. 99:15-101:22.) A salt is formed through a reaction between an acid and a free base (Rocco Tr. 99:15-17; Dr. Albert Lee ("Lee") Tr. 389:4-23); here, succinic acid reacts with the frovatriptan free base to form the salt (Rocco Tr. 99:18-100:8). A salt may be hydrous or anhydrous, depending on whether the molecule has water associated with it. (Rocco Tr. 101:3-12.) Frovatriptan monosuccinate monohydrate is a hydrate, which means that it is a crystalline form of a compound in which water is part of the crystal lattice. (Lee Tr. 390:4-6; Rocco Tr. 100:24-101:6.) Like a hydrate, a solvate is a crystalline form of a compound with

solvent molecules that form part of the crystal lattice. (Lee Tr. 390:12-13; see also Rocco Tr. 102:13-15.) As such, a hydrate can be considered a solvate in which water is the specific solvent. (Lee Tr. 390:13-15; see also Rocco 102:18-20.)

Certain molecules may exist in different orientations in three-dimensional space. (SF ¶ 30.) A molecule's three-dimensional configuration is referred to as its stereochemistry. (See Rocco Tr. 94:14-23.) Compounds may have the same molecular formula but different three-dimensional configurations, or stereoisomers. (See Rocco Tr. 94:19-23.) Where the stereoisomers are related to each other, and form non-superimposable mirror images of one another, they are known as enantiomers. (Rocco Tr. 94:24-95:25.)

A molecule's stereochemistry is indicated by certain naming conventions, such as inclusion of an (R) or (S) before the molecular formula, and may also be reflected in a diagram of the chemical structure. (SF ¶¶ 32-33; see also Rocco Tr. 96:4-97:9.) In a diagram, a line connecting two atoms represents a chemical bond located on the plane of the paper. A solid triangle represents a bond extending out in front of the paper (i.e., towards the reader), and a hatched triangle represents a bond extending behind the paper (i.e., away from the reader). (SF ¶ 33; Rocco Tr. 96:4-97:9.)

There are two enantiomers for frovatriptan, based upon whether the "$NHCH_3$" component at the 3-position is extending towards or away from the reader. (Rocco Tr. 96:4-97:9.) The specific frovatriptan enantiomer used as the API in Frova is the (R)-(+) enantiomer, which has the following chemical structure:



(PX-0008 at 1 (Frova product label); see also SF ¶¶ 5, 20.)

C. Migraine and Migraine Treatment

Frova is indicated for the acute treatment of migraine. Migraines are a neurologic (i.e., central nervous system) syndrome characterized by episodes of severe cephalic (head) pain, which may be associated with neurological, autonomic, and/or gastrointestinal symptoms and which are frequently accompanied by nausea, vomiting, and/or sensitivity to light or sound. (SF ¶¶ 15-16; see also Dr. Stephen Peroutka ("Peroutka") Tr. 534:9-536:1; Grosberg Tr. 1336: 14-22; Johnson Tr. 659:7-661:21.) The art had a similar understanding as of the priority date. If untreated or unsuccessfully treated, a migraine attack typically lasts from 4 to 72 hours, with a median duration of 24 hours. (Grosberg Tr. 1336:15-22.) The causes of migraine are unknown. (Grosberg Tr. 1338:9-10.)

Medication used to treat acute migraine attacks include both specific and nonspecific treatments. A nonspecific treatment for migraine is a treatment that addresses the symptoms of migraine, and includes acetaminophen or Tylenol, aspirin, non-steroidal anti-inflammatory drugs like ibuprofen, and combination analgesics. (Grosberg Tr. 1339:15-19.) Nonspecific treatments are sometimes available without prescription and may be effective in less severe attacks, but they are susceptible to overuse and have potential side effects. (Grosberg Tr. 1339:25-1340:5.) A specific treatment for migraine refers to a treatment that addresses the mechanism of migraine, and includes ergotamines and triptans. (Grosberg Tr. 1339:19-1340:14.) Specific treatments are generally prescription medications that are more efficacious but have lower recurrence[6] and potential for overuse. (Id.)

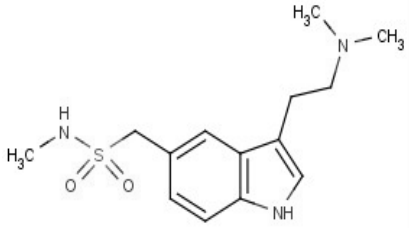
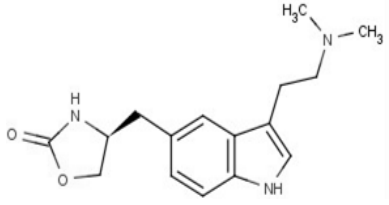
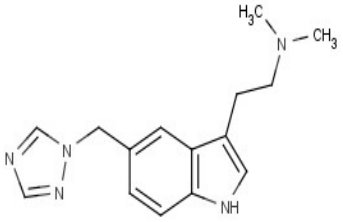
Ergotamines, or ergots, were an early form of specific treatment for migraine that became available in the 1920s. (SF ¶ 18; Peroutka Tr. 537:5-9.) Ergots were non-selective,[7] and had

[6] Recurrence refers to "the reappearance of the migraine headache after the initial treatment was successful in alleviating the pain." (Grosberg Tr. 1340:18-21.)

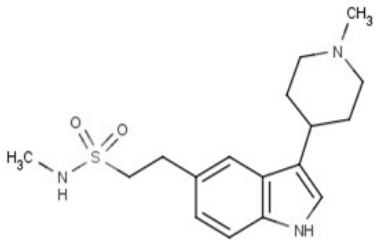
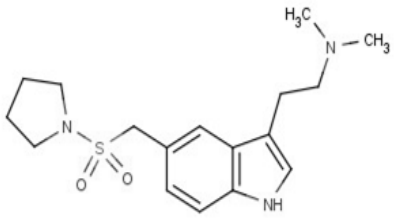
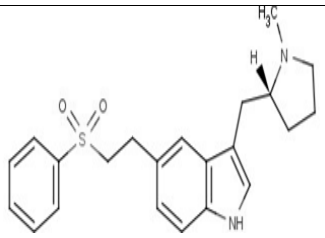
[7] Selectivity refers to the degree to which a compound "differentiates between different receptors subtypes." (Dr. David Nelson ("Nelson") Tr. 1185:5-21; see also Rocco Tr. 1645:7-9.) A "selective" drug reacts primarily with desired receptors, whereas a "non-selective" drug also interacts with other receptors. (See Rocco Tr. 116:23-117:12; Nelson Tr.

low tolerability and notable side effects, such as the contraction of blood vessels in the leg leading in some cases to gangrene. (Peroutka Tr. 553:21-554:12; Johnson Tr. 662:5-663:13; Grosberg Tr. 1340:14-17.) Compounds in the ergot family include dihydroergotamine ("DHE"), ergotamine, and methysergide. (Rocco Tr. 1687:24-1688:20 (referring to Slide 3).)

The "triptan" family of compounds, a class of tryptamine derivative compounds used to treat migraine, were an improvement over ergotamines. (SF ¶¶ 19-20; PX-0219 at 83.) Frovatriptan is a member of the triptan family, and is one of seven triptans currently on the market. (SF ¶ 20; Campbell Tr. 29:15-24.) Sumatriptan was a prior art triptan. (SF ¶ 22.) The others are listed below with the chemical structure, year of FDA approval, marketing company, and trade name.

 Sumatriptan (1993), Glaxo SmithKline, "Imitrex"	 Zolmitriptan (1997), AstraZeneca, "Zomig"	 Rizatriptan (1998), Merck, "Maxalt"

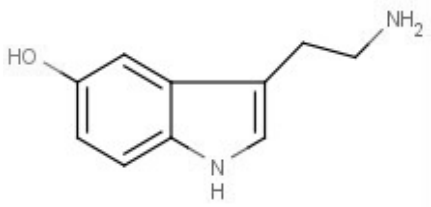
1185:8-1186:5.) A drug's selectivity impacts the potential side effects of that drug. (Rocco Tr. 115:17-21, 116:23-117:12.)

 Naratriptan (1998), Glaxo SmithKline, "Amerge"	 Almotriptan (2001), Janssen, "Axert"	 Eletriptan (2002), Pfizer, "Relpax"

(SF ¶¶ 22, 25-29; Campbell Tr. 25:21-22; PX-0121[8] at 62.) Frovatriptan is the only FDA-approved triptan with a fused three-ring or tricyclic core structure, known as a 1,2,3,4-tetrahydrocarbazole. (Rocco Tr. 123:15-17, 1696:3-11.) The other triptans have only a 2-ring core structure. (Id.) In addition, frovatriptan is the only FDA-approved triptan with an unsubstituted carboxamido substituent at its 6-position and a methylamino in its 3-position. (See Rocco Tr. 1697:8-1699:17.)

Serotonin is a member of the tryptamine class of compounds that, as of the priority date, was believed to affect migraine treatment. (SF ¶ 14; Rocco Tr. 110:10-25.) Serotonin is a naturally-occurring molecule that can function as a neurotransmitter; its chemical name is 5-hydroxytryptamine or "5-HT" and it bears the following chemical structure:

[8] Peter De Vries et al., Review: Pharmacological aspects of experimental headache models in relation to acute antimigraine therapy, 375 Eur. J. Pharm. 61 (1999).



(Id.; see also SF ¶¶ 11-13; Peroutka Tr. 536:2-14.) By 1991, there was a lot of general interest in serotonin because of its numerous biologic effects and research into serotonin was "extremely active". (DTX-1196[9] at 1; Peroutka Tr. 517:14-25; see also Johnson Tr. 938:21-939:6 (explaining that Glennon 1987 was a "very significant paper in the field of serotonin research").)

Serotonin interacts with numerous receptors throughout the body, known as 5-HT or serotonin receptors, and causes a physiological response. (See Nelson Tr. 1198:3-7; Rocco Tr. 110:23-111:9.) A chemical compound that binds to a receptor can be referred to as a "ligand." (Peroutka Tr. 614:25-615:2.) If the ligand binds to the receptor and causes a physiological or biological response, then the ligand is called an "agonist." (Rocco Tr. 111:1-9.) If the ligand binds to the receptor but does not cause a physiological or biological response, then it is called an "antagonist." (Rocco Tr. 111:10-22.) Serotonin treats migraine by interacting with certain 5-HT receptors. (Rocco Tr. 110:23-111:9.)

[9] Richard A. Glennon, Central Serotonin Receptors as Targets for Drug Research, J. Med. Chem., Vol. 30, No.1 (Jan. 1987) ("Glennon 1987").

Serotonin receptors are categorized into general families, indicated by subscripts after 5-HT, such as the "5-HT_1 family". (Rocco Tr. 112:23-113:4.) Some families are further subdivided as indicated by subscript letters that follow the numerical designation, such as 5-HT_{1B} and 5-HT_{1D}. (Rocco Tr. 112:23-113:4.) As of 1991, identification of serotonin receptor subtypes was ongoing and designations changed as research regarding the subtype structure advanced. (See Peroutka Tr. 546:9-547:19, 545:4-546:8.) By the beginning of the 1990s, a person of ordinary skill in the art knew that migraine drugs interacted with the 5-HT_1 receptor family. (Peroutka Tr. 546:9-17; Rocco Tr. 112:2-4.)

D. The King Patents

1. '864 Patent

On November 7, 1995, the United States Patent and Trademark Office (the "PTO") issued the '864 Patent, entitled "Use of Tetrahydrocarbazole Derivatives As $5HT_1$ Receptor Agonists." (PX-0001.) The '864 Patent issued from U.S. Patent Application No. 08/167,846, filed June 17, 1992, and lists a foreign application priority date of June 26, 1991. (Id.) The named inventors are Francis D. King, Laramie M. Gaster, Alberto J. Kaumann, and Rodney C. Young. The '864 Patent was granted a Patent Term Extension under 35 U.S.C. § 156 on February 10, 2006, which on its face extends the patent term to November 7, 2015. (SF ¶ 39.)

At issue in this case are claims 1, 2, 3, and 6 of the ‘864 Patent.

2. '611 Patent

On June 10, 1997, the United States Patent and Trademark Office issued the ‘611 Patent, entitled “Medicaments.” (PX-0003.) The ‘611 Patent issued from U.S. Patent Application No. 08/442,719, filed May 15, 1995, and is a continuation of the application which led to the ‘864 Patent. The ‘611 Patent originally expired on June 10, 2014. (SF ¶ 46.) However, on October 30, 2013, Endo filed a terminal disclaimer with respect to the ‘611 Patent, which effectively disclaimed that portion of its term that extends beyond the term of the ‘864 Patent. (See Dkt. Ent. 178.) The PTO accepted the terminal disclaimer on November 27, 2013. (Dkt. Ent. 188.)

The asserted claims are 1, 2, 3, 8, 9, and 10 of the ‘611 patent.

3. '871 Patent

On October 27, 1998, the United States Patent and Trademark Office issued the ‘871 Patent, entitled “Medicaments 1,2,3,4,-Tetrahydrocarbazoles and 5-HT_1 Agonist Use Thereof.” (PX-0002.) The ‘871 patent issued from U.S. Patent Application No. 08/442,720, filed May 15, 1995, and is a continuation-in-part of the application leading to the ‘864 Patent. The ‘871 Patent originally expired on October 27, 2015. (SF ¶ 53.) However, Endo

filed a terminal disclaimer, which disclaims that portion of its term that extends beyond the '611 and '864 Patents. (See Dkt. Ent. 178.) The PTO accepted the terminal disclaimer on November 27, 2013. (Dkt. Ent. 188.)

The asserted claims are 1, 2, 3, 4, 5, 6 and 7 of the ‘871 patent.

E. Ownership of Frova and the King Patents

The King Patents identify SmithKline Beecham P.L.C. (“SKB”) as the assignee. (SF ¶ 56.) SKB licensed certain rights to Frova to Vernalis Ltd. (f/k/a Vanguard Medica, and referred to herein as “Vernalis”). (Philip Green (“Green”) Tr. 2011:23-2012:4; see also SF ¶ 57.) In 1999, Vernalis submitted to the FDA NDA 21-006 for frovatriptan tablets, which the FDA approved on November 8, 2001. (SF ¶¶ 58, 60.) However, in 1998, while Frova was still in development, Vernalis licensed North American sales and distribution rights to Elan Corporation P.L.C. (“Elan”). (SF ¶ 59.)

In 2000, SKB and Glaxo Wellcome P.L.C. merged. (PX-0378 at 3.) However, because the merged entity would have owned three of the seven triptans, the United States Federal Trade Commission entered into a Consent Agreement with the merging entities pursuant to which SKB agreed to “transfer and surrender, absolutely and in good faith, all Frovatriptan Assets . . . to Vernalis . . . .” (Id. at 37.) As a result, SKB transferred all

of the rights to the Frova product and assigned the King Patents to Vernalis. (Green Tr. 2012:4-12.)

Pursuant to an agreement with Vernalis, and in conjunction with UCB Pharma Inc., Elan launched the Frova product in the United States in 2002. (See Campbell Tr. 30:11-14; Green Tr. 2004:6-15; DTX-1153 at 9.) Two years later, Vernalis reacquired from Elan the commercialization rights for the Frova product in North America. (Green Tr. 2012:13-16.) Vernalis subsequently licensed the U.S. rights to Endo in 2004 (DTX-1003; Green Tr. 2012:17-18) and ultimately assigned the King Patents to Endo in 2011 (SF ¶ 61; DTX-1059).

F. This Court's Claim Construction Opinion

On August 7, 2013, the Honorable Joseph E. Irenas issued a Claim Construction Opinion that addressed three disputed claim terms of the King Patents. First, the Court construed the term "compound of (general) formula (I)," which appears in claim 1 of each of the King Patents. (See Claim Constr. Op. 8-10.) After noting that the parties agreed that the compound includes "all R [enantiomers] and no S to all S and no R, and every ratio in between," the Court determined that this term refers to "the formula without regard to its stereochemistry." (Id. at 9.)

Second, the Court construed the term "or a salt, solvate or hydrate thereof," which appears in claim 1 of the '864 Patent, as meaning "or one or more of salt, solvate or hydrate thereof."

(Id. at 11-14.) The Court saw "no basis for finding that 'salt' does not also include a salt that is also a hydrate or also a solvent." (Id. at 12.) The parties agreed that salt should be similarly construed in claim 6, which refers to "a physiologically acceptable salt thereof." (Id. at 11.)[10]

Third, the Court construed the term "treatment of a condition wherein a 5-HT1-like agonist is indicated," which appears in claim 2 of the '864 Patent,[11] claim 1 of the '871 Patent, and claim 10 of the '611 Patent, as meaning "treatment without prophylaxis." (Id. at 20.)

LEGAL ANALYSIS

A patent and each of its claims are presumed to be valid, even where those claims may be dependent upon other invalid claims in the patent. 35 U.S.C. § 282(a). A party may rebut this presumption of validity with clear and convincing evidence of invalidity. Sciele Pharma Inc. v. Lupin Ltd., 684 F.3d 1253, 1260 (Fed. Cir. 2012) (citing 35 U.S.C. § 282 and Microsoft Corp. v. i4i Ltd. P'ship, -- U.S. --, 131 S. Ct. 2238, 2245 (2011)). "The 'clear and convincing' standard of proof of facts

[10] The Court's Claim Construction Opinion addressed similar terms appearing in other asserted claims of the '611 and '871 Patents (id.), which are no longer relevant in light of Endo's waiver of its rights and the Court's decision to estop Endo from proceeding under these Patents in this litigation.

[11] This term also affects claim 3 of the '864 Patent, which refers to the method in claim 2.

is an intermediate standard which lies somewhere between 'beyond a reasonable doubt' and a 'preponderance of the evidence' . . . [and] has been described as evidence which produces in the mind of the trier of fact 'an abiding conviction that the truth of [the] factual contentions are highly probable.'" Buildex Inc. v. Kason Indus., Inc., 849 F.2d 1461, 1463 (Fed. Cir. 1988) (citations omitted).

Where an invalidity challenge is based upon prior art that was considered by the PTO during the patent prosecution, and where a patent was issued notwithstanding the prior art, "a court owes some deference to the PTO's decision." Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc., 976 F.2d 1559, 1572 (Fed. Cir. 1992) (citations omitted)). Although Defendants' burden does not change, evidence considered by the PTO may not be given the same weight as new evidence. See Sciele Pharma Inc., 684 F.3d at 1260 ("[N]ew evidence not considered by the PTO 'may carry more weight . . . than evidence previously considered by the PTO,' and may 'go further toward sustaining the attacker's unchanging burden.'" (citing Microsoft Corp., 131 S. Ct. at 2251)).

I. Endo Abandoned Its Claims Related to the '871 and '611 Patents

During the trial, Endo abandoned its claims related to the '871 and '611 Patents. As a result, this Court ruled that Endo

would be estopped from resurrecting those claims at a later date in this litigation.[12] Endo's abandonment of those claims occurred in the midst of trial after some evidence relating to those patents already had been presented. Endo stated that "with this [terminal] disclaimer everything rises and falls on the '864 patent, we can litigate the '864 patent and that will govern what occurs in the case."[13] (Tr. 268:22-269:19.) Hence, it was the Court's view that any further effort to pursue claims against Mylan related to the '871 and '611 patents, in this litigation, would be judicially estopped. Endo had asserted claims against Mylan relating to the '871 and '611 Patents in the current litigation but midway chose instead to abandon them in favor of the '864 Patent. Permitting Endo to reassert the abandoned claims against Mylan later in this litigation (or even

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[12] It is clear Endo would also be estopped in subsequent litigation.

[13] On the eve of trial, Endo filed a terminal disclaimer, which disclaims:

> (i) the terminal part of the term of the '871 patent which would extend beyond the expiration dates of the full terms of the '611 patent and . . . [the '864 patent], and (ii) the terminal part of the term of the '611 patent which would extend beyond the expiration date of the full term of the '864 patent.

(Dkt. Ent. 178-1.) In addition, the disclaimer provides that the '871 and '611 Patents "shall be enforceable only for and during such period that they and the '864 patent are commonly owned." (Id.) The terminal disclaimer was later approved by the PTO. (See Dkt. Ent. 188.)

in the future) would be manifestly unjust to Defendants and, therefore, judicial estoppel is an appropriate remedy. Cf. Van Blunk v. McAllister Towing of Phila., Inc., No. 10-00686, 2012 WL 832997, at *5 (D.N.J. Mar. 12, 2012) (judicially estopping plaintiff from presenting inconsistent position in order to "prevent manifest injustice" and prejudice to defendant); Haines & Kibblehouse, Inc. v. Balfour Beatty Constr., Inc., 789 F. Supp. 2d 622, 636 (E.D. Pa. 2011) (same).

Endo now argues that the Court erred because Endo was permitted to file the terminal disclaimer at any point in this litigation and that filing could not be deemed an admission of the merits of the double-patenting allegation. Although Endo is correct as to the legal effect of the terminal disclaimer, its arguments miss the point: the Court based its decision not on the terminal disclaimer, but on the unequivocal statements of counsel signifying Endo's intent to abandon its claims here. See, e.g., Boehringer Ingelheim Int'l GmbH v. Barr Labs., Inc., 592 F.3d 1340, 1347 (Fed. Cir. 2010) (terminal disclaimer may be filed lawfully at any time "after issuance of the challenged patent or during litigation, [or] even after a finding that the challenged patent is invalid for obviousness-type double patenting") (citations omitted); Quad Envtl. Techs. Corp. v. Union Sanitary Dist., 946 F.2d 870, 874 (Fed. Cir. 1991) ("It is improper to convert this simple expedient of "obviation" [of a

rejection of double-patenting] into an admission or acquiescence or estoppel on the merits."); (see also Pl.'s Opening Post-Trial Br. ("Pl.'s Br."), Dkt. Ent. 191, at 36-37). When Endo advised the Court that it had filed a terminal disclaimer with respect to the '871 and '611 Patents, it stated that "[i]n preparing for trial it has become clear that issues concerning Mylan's infringement of the '871 and '611 Patents are consistent with those for infringement of the '864 Patent," and Endo wished to "simplif[y] the issues for the upcoming trial" by mooting Mylan's double-patenting defense.[14] (Letter, Dkt. Ent. 178 at 2.) The Court understood from this letter, together with the voluntary filing of the terminal disclaimer, that, contrary to the Final Pretrial Order, Endo no longer wished to proceed with its claims against Mylan as to these two patents. Endo treated the terminal disclaimer, in essence, as a withdrawal of Endo's claims. (See, e.g., Tr. 254:24-255:18 ("THE COURT: . . . either way you look at it Mylan is not threatened by those patents as a result of the filing of the disclaimer . . . you no longer have any threat of prosecution."); Tr. 268:3-7 ("MS. STAFFORD: . . . I think Endo is claiming if you allow their terminal claims to

[14] Obviousness-type double patenting is a judicially created doctrine intended "to prevent the extension of the term of a patent . . . by prohibiting the issuance of the claims in a second patent not patently distinct from the claims of the first patent." In re Longi, 759 F.2d 887, 892 (Fed. Cir. 1985).

moot our defense that their claims for those patents still continue. THE COURT: But not as to Mylan.").)[15]

Endo's counsel then repeatedly confirmed its intention to abandon the claims related to the '871 and '611 Patents as set forth in the Pretrial Order:

> THE COURT: . . . Do I have it all wrong, Mr. Lewis? Maybe I do. . . .
> MR. LEWIS: Unfortunately, a lot of it wrong, **but not on that point**.
> THE COURT: I thought you were giving up your fight against Mylan on the other two patents by filing the disclaimer.
> MR. LEWIS: **What I've said, your Honor, is that with this disclaimer everything rises and falls on the '864 patent, we can litigate the '864 patent and that will govern what occurs in the case.**
> THE COURT: Okay. But just answer my question with a yes or no, if you can. Do you agree that by filing the disclaimer . . . that you no longer would have any claims against Mylan on the remaining two patents?
> MR. LEWIS: It is effective and the claim stops at the date that those patents are terminally disclaimed on those patents, but the '864 runs longer. And **we believe the '864 patent covers all of the issues in the case and everything else [rises and falls] on that in terms of the infringement**.

[15] See also Tr. 275:18-276:2 ("THE COURT: . . . So I understand Endo's position is that [the disclaimer is] effective because that's where Endo is, they no longer wish to pursue the '611 and '871, I get that, the issue for the Court is is it a final order, so to speak. And, as of now, it isn't. But it really is a moot point at this juncture because I think regardless the issue of going forward is this case will go forward on the '864 . . . and Endo is estopped from further pursuing any cause of action against Mylan for those two patents on this ANDA.").

(Tr. 268:22-269:19 (emphasis added); see also Tr. 271:23-272:1.)[16] Indeed, counsel affirmed that "there is no risk to Mylan separate that goes beyond the '864 patent" (Tr. 272:10-11), and offered to stipulate that "the case [rises] and falls with the '864 patent" (Tr. 277:19-21; Tr. 278:3-6). These statements provided to the Court a clear indication of Endo's intent to abandon or withdraw its claims regarding the '871 and '611 Patents, and to proceed only with the '864 Patent infringement action here.

Despite these concessions, Mylan remained concerned that Endo would at some later point attempt to revive the claims it had just waived. Thus, the Court stated:

> But what I asked Mr. Lewis is why shouldn't [you be] judicially estopped from prosecuting under the '611 and '871 if I deem the terminal disclaimer to have the effect you say I should deem it to have. And Mr. Lewis' response is that we should be judicially estopped and I think that's the right answer.

(Tr. 274:10-15.) Endo, however, clarified only that it believed the terminal disclaimer to be effective. (Tr. 275:4-6.) But, having decided to "litigate the '864 patent" only at such late juncture, i.e., the second day of trial, Endo would not later be

[16] Counsel's statements imply that the asserted claims of the '871 and '611 Patents may not be "patentably distinct" from the asserted claims of the '864 Patent and, therefore, seemingly bolster Defendants' double-patenting argument. However, no proofs were submitted on this issue, and the Court does not decide it here.

permitted to resurrect claims against Mylan on the other two patents.[17] (See Tr. 269:4-7.)

Endo also now argues that the requirements for judicial estoppel are not met as there is no evidence of bad faith. "Though there is no rigid test for judicial estoppel, three factors inform a federal court's decision whether to apply it: there must be (1) 'irreconcilably inconsistent positions;' (2) 'adopted . . . in bad faith;' and (3) 'a showing that . . . estoppel . . . address[es] the harm and . . . no lesser sanction [is] sufficient.'" Singer Mgmt. Consultants, Inc. v. Milgram, 650 F.3d 223, 239 (3d Cir. 2011) (quoting G–I Holdings, Inc. v.

[17] Cf. Johnson v. Zerbst, 304 U.S. 458, 464 (1938) ("A waiver is ordinarily an intentional relinquishment or abandonment of a known right or privilege."), overruled on other grounds by Edwards v. Arizona, 451 U.S. 477 (1981); Boro Constr., Inc. v. Lenape Reg'l High Sch. Dist. Bd. Of Educ., No. 05-4689, 2010 WL 5419035, at *6 (D.N.J. Dec. 23, 2010) (noting waiver of contractual rights may be supported "by such conduct as to stop the waiving party from denying the intent to waive"); Singer Mgmt. Consultants, Inc. v. Milgram, 650 F.3d 223, 239 (3d Cir. 2011) ("If the State were to assert again that the Truth in Music Act does not recognize valid common law trademarks, it would be asserting an inconsistent position in presumptive bad faith after already having conceded the wrongfulness of such an assertion. Judicial estoppel, therefore, would apply to prevent the State from perpetuating a fraud on the court."); see also Holstein v. City of Chi., 803 F.Supp. 205, 211 (N.D. Ill. 1992) ("If an individual intentionally relinquishes a known right, either expressly or by conduct inconsistent with an intent to enforce that right, he has waived it."(citing J.H. Cohn & Co. v. Am. Appraisal Assocs., Inc., 628 F.2d 994, 1000 (7th Cir. 1980))).

Reliance Ins. Co., 586 F.3d 247, 262 (3d Cir. 2009)).[18] Endo is correct. Its change in position before this Court, i.e., that it would pursue the '864 Patent only, did not evince bad faith at the time. But, Endo's current position - "that its infringement claims against Mylan on the '611 and '871 Patents should have remained a part of this case" – is directly contradicted by the arguments made before this Court during trial (and summarized above). (Pl.'s Br. at 37.) Moreover, its current assertion that it has somehow maintained a consistent position all along troubles the Court. Nonetheless, for the reasons stated, Endo abandoned its claims, and is thus estopped from further pursuing claims against Mylan related to the '871 and '611 Patents in this matter.

II. Invalidity of the '864 Patent

Turning to the '864 Patent, Endo asserts that Mylan's ANDA product will infringe claims 1, 2, 3, and 6. Claim 1, the only independent claim, states: "A compound of formula(I) which is 3-methylamino-6-carboxamido-1,2,3,4-tetrahydrocarbazole, or a salt, solvate or hydrate thereof." (PX-0001 col.20 ll.44-46.)[19]

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[18] In a patent action, judicial estoppel "is applied in accordance with the law of the regional circuit as opposed to Federal Circuit law." Novo Nordisk A/S v. Bio-Tech. Gen. Corp., Ltd., No. 02-332, 2003 WL 21383717, at *2 (D. Del. June 9, 2003) (citations omitted).

[19] Claim 2 claims "A method of treatment of a condition wherein a 5-HT_1-like agonist is indicated, which comprises administering to a subject in need thereof an effective amount

Although Mylan disputes the Court's claim construction, Mylan filed a Notice of Concession of Infringement prior to the commencement of trial whereby it conceded that, under the claim construction, "the manufacture, use, sale, offer for sale, or importation of Mylan's ANDA Product infringes" and/or "will constitute contributory infringement or induce infringement" of each claim at issue. (Dkt. Ent. 182; see also Pretrial Order, Dkt. Ent. 171, at 19.)

Mylan contends, however, that the '864 Patent is invalid on four separate grounds: anticipation, obviousness, lack of written description, and failure to enable. Before turning to the merits of these arguments, the Court notes two things. First, the parties agree that the difference in how they define a person of ordinary skill in the art ("POSA") with respect to the patents is immaterial to the invalidity analysis. (See Tr. of Oct. 24, 2013 H'rg 45:10-25 (acknowledging that experts would render the same opinions regardless of which definition is utilized); see also Johnson Tr. 658:24-659:3; Rocco Tr. 1700:25-1701:4.) Therefore, the Court adopts Endo's definition:

> A person of ordinary skill in the art of the King Patents as of the June 26, 1991 priority date would be

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of a compound of claim 1." Claim 3 claims "The method according to claim [2] wherein the condition is migraine." Claim 6 claims "A pharmaceutical composition comprising the compound according to claim 1, or a physiologically acceptable salt thereof and a physiologically acceptable carrier." (PX-0001 col.20 ll.47-52, 57-59.)

> a medicinal chemist with a Ph.D. or its equivalent and 2-5 years of experience in the pharmaceutical industry, working in conjunction with both a pharmacologist with a Ph.D. or its equivalent with experience in the pharmaceutical industry and a medical professional with experience in the treatment of conditions for which a 5-HT1-like agonist is indicated and/or drug development. (See Tr. 1608:1-9 (Rocco).)

Second, the Court notes that the parties have stipulated that the priority date applicable to all claims at issue in this case is June 26, 1991. (SF ¶ 34.)

A. Anticipation

Mylan argues that U.S. Patent No. 4,257,952 ("Mooradian '952"), entitled "3-Amino-Tetrahydrocarbazoles", anticipates the asserted claims in the '864 Patent. The Court disagrees.

"[T]he dispositive question regarding anticipation is whether one skilled in the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference." AstraZeneca v. Apotex, 633 F.3d 1042, 1055 (Fed. Cir. 2010) (quoting In re Baxter Travenol Labs., 952 F.2d 388, 390 (Fed. Cir. 1991)) (internal quotations and brackets omitted). In other words,

> Claimed subject matter is "anticipated" when it is not new; that is, when it was previously known. Invalidation on this ground requires that every element and limitation of the claim was previously described in a single prior art reference, either expressly or inherently, so as to place a [POSA] in possession of the invention. See Schering Corp. v. Geneva Pharms., Inc., 339 F.3d 1373, 1379 (Fed. Cir.

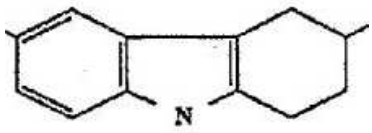
2003); Continental Can Co. USA v. Monsanto Co., 948 F.2d 1264, 1267-69 (Fed. Cir. 1991).

Sanofi–Synthelabo v. Apotex, Inc., 550 F.3d 1075, 1082 (Fed. Cir. 2008), cert. den'd, 130 S. Ct. 493 (2009). Anticipation is a question of fact, and the party invoking this defense must establish it at trial by clear and convincing evidence. AstraZeneca, 633 F.3d at 1055 (citing Sanofi–Synthelabo, 550 F.3d at 1082, and Purdue Pharma L.P. v. Boehringer Ingelheim GmbH, 237 F.3d 1359, 1365 (Fed. Cir. 2001)).

Anticipation requires that "all limitations of the claimed invention are described in a single reference, rather than a single example in the reference." Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1369 n.5 (Fed. Cir. 2008). The court must look at the reference "as a whole" and determine whether it discloses all elements of the claimed invention as arranged in the claim. Id.; see also Cellectis S.A. v. Precision Bioscis., Inc., 937 F.Supp.2d 474, 487 (D. Del. 2013) ("As noted above, a prior art reference must disclose all of the limitations of the claim, 'arranged or combined in the same way as in the claim,' to anticipate a claim." (quoting Net MoneyIN, Inc., 545 F.3d at 1370)).

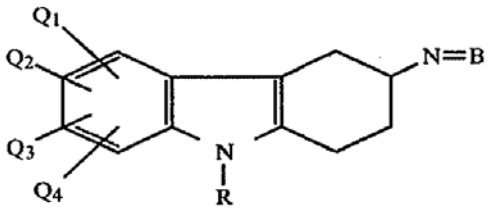
Mooradian '952 is a prior art patent that was considered by the PTO in the prosecution of the '864 Patent and is in fact listed as a reference on the cover page of the '864 Patent. (PX-

0001, at [56]; accord DTX-1077 at 191.) It discloses a broad class of compounds chemically designated as 3-(substituted-amino)-1,2,3,4-tetrahydracarbazoles with “analgetic and psychotropic activities” as well as, in some cases, antihistaminic activity. (DTX-1019, at [57].) The 1,2,3,4-tetrahydracarbazole is characterized by a tricyclic ring core structure as pictured below. (See, e.g., Johnson Tr. 760:13-14.)



(PX-0001, at [57].)

Claim 1 of Mooradian ‘952 claims a 3-(N==B)-9-R-1,2,3,4-tetrahydracarbazole having the formula



where N==B is NHR’, NR’R” or NR’”-Y_NR’NR”, where R’ and R” are lower-alkyl or AR-lower-alkyl, R’”is hydrogen and Y is lower-alkylene; R is hydrogen, lower-alkyl, Ar-lower-alkyl or lower-alkenyl, or R is Y-NR’R”, where Y, R’ and R” have the same meaning given above. (DTX-1019 col.63 ll.4-22.) Claim 1 permits Q_1, Q_2, Q_3, and Q_4 to be selected from a variety of substituents listed in the claim. Thus, Mooradian ‘952 permits substitution on the left-hand side of the tetrahydrocarbazole ring system at

the 5-, 6-, 7-, or 8-position. (Johnson Tr. 759:8-12.) A carboxamido is one of the substituents. (DTX-1019 col.64 ll.1-6.)

It is undisputed that claim 1 of Mooradian '952 "encompasses frovatriptan" and "the elements of frovatriptan." (Rocco Tr. 1620:13-25, 1795:24-1796:1.) Specifically, Dr. Johnson, Mylan's expert, testified that frovatriptan can be envisaged where N==B is NHR' and R' is methyl; R is hydrogen; Q_1 is $CONR_2R_3$ at the six position of the ring structure, and R_2 and R_3 are hydrogen; and Q_2, Q_3, and Q_4 are hydrogen at the five, seven, and eight position. (Johnson Tr. 762:6-763:5.) However, "[i]t is well established that the disclosure of a genus in the prior art is not necessarily a disclosure of every species that is a member of that genus." Atofina v. Great Lakes Chem. Corp., 441 F.3d 991, 999 (Fed. Cir. 2006). "If a prior art reference merely discloses a genus and the claim at issue recites a species of that genus, 'the issue of anticipation turns on whether the genus was of such a defined and limited class that one of ordinary skill in the art could 'at once envisage' each member of the genus.'" Cellectis, 937 F. Supp. 2d at 487 (quoting Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC, 683 F.3d 1356, 1361 (Fed. Cir. 2012)); see also Eli Lilly & Co. v. Zenith Goldline Pharm., Inc., 471 F.3d 1369, 1376 (Fed. Cir. 2006) (finding a POSA must be able to "at once envisage" each member

of a class of compounds); In re Gleave, 560 F.3d 1331, 1338 (Fed. Cir. 2009). The issue, then, is whether, the particular genus disclosed in claim 1 of Mooradian '952 is so defined and limited that a POSA can at once envisage each species.

Both experts agree that Mooradian '952 discloses a "broad genus" of compounds with a variety of functional groups that can be attached to the left ring, which ultimately embodies a very "large number" of compounds. (Johnson Tr. 895:6-16; Rocco Tr. 1616:1-18, 1617:14-1618:14; see also Dr. Francis D. King ("King") Tr. 290:20-291:2 ("[G]enerically [Mooradian '952] does disclose the Frovatriptan type compound, but it is only one of a potential million plus compounds that that general structure discloses."). Endo's expert, Dr. Rocco, testified that this genus encompasses "millions, tens of millions" of compounds, while Dr. Johnson, conceded that this "broad genus" of compounds consisted of what "could be a large number" of individual compounds. (Johnson Tr. 895:6-16.) Furthermore, it is undisputed that frovatriptan is not among the approximately 297 compounds disclosed in the Mooradian '952 specification (Johnson Tr. 895:22-25; Rocco Tr. 1620:3-10) or one of the eight compounds specifically claimed. (Rocco Tr. 1619:21-1620:2; see also DTX-1019 col.64.)

In looking at the patent as a whole, as this Court must, see Net MoneyIN, Inc., 545 F.3d at 1369 n.5, the Court does not

find that claim 1 of the '864 Patent is anticipated by Mooradian '952. Dr. Rocco, whom this Court found persuasive, opined that, although a POSA "could tease out the elements of frovatriptan" from the broad disclosure in Mooradian '952, she would not immediately envision the frovatriptan molecular structure. (Rocco Tr. 1616:20-23, 1620:24-1621:3.) Dr. Rocco's opinion is supported by the patent's list of four "preferred" groups of compounds which provide limitations on the substituents in certain positions on the compounds. See Brigham & Women's Hosp. Inc. v. Teva Pharms. USA, Inc., 761 F. Supp. 2d 210, 227-28 (D. Del. 2011) (citing In re Petering, 301 F.2d 676, 681 (C.C.P.A. 1962)) (looking to preferred groups of compounds set forth in prior art patent and determining that claims were not anticipated); (DTX-1019 col.2 ll.19-41; Rocco Tr. 1616:14-1618:14). Although these preferred groups narrow the broader genus of disclosed compounds in Mooradian '952, they still encompass "hundreds or thousands of compounds." (Rocco Tr. 1616:14-1617:14.) Even so, Drs. Rocco and Johnson agree that none of these preferred groups include the frovatriptan structure. (Rocco Tr. 1616:14-20, 1618:17-20; Johnson Tr. 896:1-25.) In fact, the "more preferred group" specifically excludes a carboxamido group similar to the one that appears at the six

position of frovatriptan. (Rocco Tr. 1617:10-1618:15.)[20] Given the compounds and preferred groups actually disclosed in Mooradian '952, this patent does not provide any "motivation or reason for anyone to pull [frovatriptan] out explicitly." (See Rocco Tr. 1625:13-21.)

Dr. Johnson testified, however, that Mooradian '952 teaches a preference for each element of the frovatriptan compound - the 1,2,3,4-tetrahydrocarbazole core, the 3-methylamino, and the 6-carboxamido – such that a POSA would "at once envisage" frovatriptan. Claim 7 of Mooradian '952, which is the same compound listed in Example 23, specifically claims a compound containing a 3-methylamino. (Rocco Tr. 1796:7-1797:1; DTX-1019 col.64 l.29; id. col.29 ll.1-18.) However, the claim 7 compound is the only claimed compound that contains a methylamino: five of the seven claimed compounds contain a 3-dimethylamino, which

[20] Dr. Rocco testified that:

> There is no way that within this preferred group you could even contemplate the carboxamide because carboxamide isn't lower alkyl, carboxamide is not halo. Carboxamide is not an aromatic group bonded through an oxygen, or is an aromatic group in and of itself. So it seems to be excluding that type of functionality group from this preferred group of compounds . . . one of skill in the art looking at this preferred group of compounds . . . could not tease out from that group [carboxamido] because it's not there . . .

(Rocco Tr. 1619:1-15.)

seems to suggest a preference for the dimethylamino substituent over the methylamino. (See DTX-1019 col.64 ll.20-33.) At the very least, the fact that only one of these compounds is a methylamino undermines Dr. Johnson's conclusion that Mooradian '952 teaches a 3-methylamino.

Admittedly, the only difference between the compound in claim 7 and frovatriptan is the carboxamido group that appears at the six position of frovatriptan. (Johnson Tr. 753:12-20.) Dr. Johnson testified that Mooradian '952 indicates a "clear preference" for placing a carboxamido group at either the six or eight position (Tr. 764:10-765:17, 771:6-17), and a "clear teaching" for the 6-carboxamido substituent (Tr. 777:8-12). In support, he points to six examples reflecting a carboxamido-derivative substituent at the 6-position,[21] and seven examples at the 8-position.[22] (Johnson Tr. 764:10-765:17, 771:6-17.) However, as Dr. Rocco pointed out, most of these carboxamido-derivatives are "very elaborate functional groups" that are "very different" substitutions from the unsubstituted carboxamido that is in frovatriptan. (Rocco Tr. 1628:4-1629:3.) Only the carboxamido substituent in Example 250 is the same group as that in

[21] The compounds that contain 6-carboxamido derivatives are found in Examples 69, 71, 73, 74, 77, and 79 of DTX-1019.

[22] The compounds that contain 8-carboxamido derivatives are found in Examples 68, 70, 72, 75, 76, 78, and 250 of DTX-1019.

frovatriptan, and that group appears at the 8-position of the disclosed compound.[23] (Johnson Tr. 765:20-766:6; Rocco Tr. 1799:2-19.) Thus, Mooradian '952 does not teach any preference for an unsubstituted carboxamido at the 6-position.[24] (See Rocco Tr. 1625:24-1627:1.)

The Court finds Dr. Rocco's testimony to be credible and persuasive. It is further influenced by the fact that Mooradian '952 was disclosed to the PTO during the prosecution of the '864 Patent and the PTO issued the '864 Patent notwithstanding this reference. (PX-0001, at [56].)[25] See Minn. Mining & Mfg. Co., 976

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[23] Example 250 is 3-dimethylamino-8-aminocarbonyl-1,2,3,4-tetrahydrocarbazole. (DTX-1019 col. 52 ll.8-24.) Mylan failed to demonstrate why a POSA would be motivated to change the 3-dimethylamino to a 3-methylamino, and also move the carboxamido to the 6-position.

[24] Dr. Johnson cites a statement contained within another SKB patent as confirming his opinion that a POSA would at once envisage the frovatriptan compound within Mooradian '952. That patent states:

> U.S. Pat. Nos. 4,257,952, 4,172,834, 4,062,864 and 3,959,309 describe a broad class of 3-amino and 3-(substituted amino) tetrahydrocarbazoles having a variety of substituents at the 5, 6, 7 and/or 8 positions, including inter alia the group -- $CONR_2R_3$ wherein R_2 and R_3 are hydrogen, lower alkyl or together with the nitrogen atom form a heterocyclic ring.

(DTX-1395 col.1 ll.9-16; see also Johnson Tr. 767:15-769:22, 770:16-17.) However, this patent was filed December 16, 1993 and claims priority to a foreign application dated December 21, 1992 (DTX-1395, at [22], [30])—both of which are after the priority date applicable here.

[25] Although Mylan makes much of the fact that Mooradian '952 was not "substantively discussed" during the prosecution of the '864 Patent, the file wrapper shows that the PTO examiner

F.2d at 1572 (“Where the PTO has considered a piece of prior art, and issued a patent notwithstanding that prior art, a court owes some deference to the PTO's decision.” (citations omitted)). Cf. Sciele Pharma Inc., 684 F.3d at 1260.

The Court concludes that Defendants have not established by clear and convincing evidence that Mooradian ‘952 anticipates the compound claimed in claim 1 of the ‘864 Patent because (i) Mooradian ‘952 discloses a “broad genus” that encompasses millions of compounds, (ii) this broad genus is narrowed into “preferred” groups of compounds that still include thousands of compounds but do not include frovatriptan, and (iii) Mooradian ‘952 does not teach a preference for either the 3-methylamino or an unsubstituted carboxamido group at the 6-position. See, e.g., Brigham & Women’s Hosp. Inc., 761 F. Supp. 2d at 227-28 (finding that a POSA would not “at once envisage” the claimed compound from a prior art patent that disclosed a broad genus of compounds and a narrower list of preferred compounds that did not include the challenged compound); Hoffmann-La Roche Inc. v.

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initialed the reference sheet to indicate that this reference was considered and the Court will not assume otherwise. (DTX-1077 at 191.) Notably, the applicants specifically directed the Examiner to Mooradian ‘952: “Applicants take this opportunity to call to the Examiner’s attention U.S. Patent 4,257,952, issued March 24, 1981 to Mooradian, which is believed to be of particular relevance to the subject matter of this invention.” (Id. at 118.) Yet, the Examiner permitted the claims. (Id. at 99-100.)

Cobalt Pharms. Inc., No. 07-4539, 2010 WL 4687839, at *5 (D.N.J. Nov. 10, 2010) ("Cobalt has not persuaded this Court that, based on the statements of preference, a skilled artisan could at once envision the species that is ibandronic acid. On this record, this Court cannot conclude that Cobalt is more likely than not to be able to prove anticipation by the Van Duzee patent by clear and convincing evidence.").

Because claim 1 is not anticipated by Mooradian '952, as a matter of law its dependent claims are not anticipated. Corning Glass Works v. Sumitomo Elec. USA, Inc., 868 F.2d 1251, 1256 n.4 (Fed. Cir. 1989) ("Because we conclude that claim 1 is not anticipated, claim 2, which is dependent on claim 1, need not be separately discussed."); RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1446 (Fed. Cir. 1984) (same); see also Carnegie Mellon Univ. v. Marvell Tech. Grp., Ltd., No. 09-290, 2011 WL 4527353, at *5 (W.D. Pa. Sept. 28, 2011) (same).

B. Obviousness

Mylan next contends that each asserted claim of the '864 Patent is invalid as obvious as of the priority date. A patent is invalid as obvious if the differences between the claimed invention and prior art are such that the invention as a whole would have been obvious to a POSA at the time the invention was made. Sciele Pharma Inc., 684 F.3d at 1259 (quoting 35 U.S.C. § 103(a)). Whether a patent claim is obvious is a question of law

based on four underlying facts: 1) the scope and content of the prior art; (2) the level of ordinary skill in the pertinent art; (3) the differences between the prior art and the claims at issue; and (4) such secondary considerations as commercial success, long felt but unsolved need, and the failure of others. Id. (quoting Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966)); see also KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 406 (2007). Generally, this inquiry considers whether a person skilled in the art would have had (1) a reason to combine the teachings of the prior art references to achieve the claimed invention, and (2) a reasonable expectation of success in doing so.[26] In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig., 676 F.3d 1063, 1068-69 (Fed. Cir. 2012) (internal citations omitted).

In KSR, the Supreme Court cautioned that this inquiry must be "expansive and flexible" and must account for the fact that a POSA is also "a person of ordinary creativity, not an automaton." Id. at 415, 421. There need not be "precise

[26] The Court notes that "[o]bviousness does not require absolute predictability of success. . . . For obviousness under § 103, all that is required is a reasonable expectation of success." In re O'Farrell, 853 F.2d 894, 903-04 (Fed. Cir. 1988); see also Bayer Schering Pharma AG v. Barr Labs., Inc., 575 F.3d 1341, 1350 (Fed. Cir. 2009); Pfizer, Inc. v. Apotex, Inc., 480 F.3d 1348, 1364 (Fed. Cir. 2007).

teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a [POSA] would employ." Id. at 418.

Importantly, "if a technique has been used to improve one device, and a [POSA] would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." Id. at 417. Relevant to this analysis is whether there was a reason or motivation to combine the known elements in the manner claimed by the patent. Id. at 418. Indeed, "[o]ne of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims." Id. at 419-20. "[I]n many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." Id. at 420.

Finally, an invention is "obvious-to-try" and therefore invalid under 35 U.S.C. § 103 if it results from a skilled artisan merely pursuing "known options" from "a finite number of identified, predictable solutions." In re Cyclobenzaprine, 676 F.3d at 1070 (quoting KSR, 550 U.S. at 421) (internal quotations omitted).

In conducting its analysis, the Court must be cognizant that "[a]lmost any invention, no matter how nonobvious at the

time, will appear obvious when looking backward from the solution. It is for that reason that '[c]are must be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit'." Janssen Pharmaceutica N.V. v. Mylan Pharmas., Inc., 456 F. Supp. 2d 644, 662 (D.N.J. 2006) (citation omitted and emphasis in original).

Mylan submits that the asserted claims of the '864 Patent are (1) obvious in light of prior art references Mooradian '952 and/or Mooradian 1977,[27] when considered alone or in combination with a POSA's knowledge as of the priority date; (2) obvious in light of 5-CT as the appropriate lead compound; and (3) obvious in light of prior art which would motivate a POSA to modify 5-CT to obtain frovatriptan with a reasonable expectation of success. Subsumed within this last argument is the assumption that a POSA would begin with 5-CT, which as set forth below, the Court rejects.

1. Mooradian '952 and Mooradian 1977 Do Not Render the Asserted Claims Obvious

Mylan asserts that Mooradian '952 and Mooradian 1977, alone or in combination, render the claims obvious. The Court

[27] Adam Mooradian et al., 3-Aminotetrahydrocarbazoles as a New Series of Central Nervous System Agents, J. Med. Chem., Vol. 20, No. 4 (1977) ("Mooradian 1977").

disagrees. Individually and separately, these references teach a preference for a 3-dimethylamino substituent, which is not found within frovatriptan, and do not suggest a preference for a 6-carboxamido. They further do not suggest utility in treatment of a condition wherein a 5-HT_1-like agonist is indicated (claim 2) or migraine (claim 3). And, of particular importance to the Court, both Mooradian '952 and Mooradian 1977 were disclosed to and considered by the PTO during prosecution of the '864 Patent, and yet the PTO issued the '864 Patent notwithstanding these prior art references. (PX-0001, at [56]; DTX-1077 at 191.) The Court accords some deference to the PTO's findings in this regard. See Sciele Pharma Inc., 684 F.3d at 1260.

As explained in detail above, Mooradian '952 disclosed a very broad genus of 3-(substituted-amino)-1,2,3,4-tetrahydracarbazole compounds, and in some ways teaches away from frovatriptan. For instance, the broad genus of compounds disclosed by Mooradian '952 is narrowed into "preferred" groups of compounds that still include thousands of compounds but do not include frovatriptan. Indeed, as Dr. Rocco opined, as least one of these "preferred" groups explicitly excludes and therefore teaches away from inclusion of a carboxamido similar to that of frovatriptan. (See Rocco Tr. 1618:10-14); Galderma Labs., L.P. v. Tolmar, Inc., 737 F.3d 731, 738 (Fed. Cir. 2013) ("A reference may be said to teach away when a person of

ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." (citing DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc., 567 F.3d 1314, 1327 (Fed. Cir. 2009))). In addition, as set forth above, Mooradian '952 teaches a preference for a 3-dimethylamino substituent, which would lead a POSA away from frovatriptan. (See DTX-1019 col.64 ll.24-33.) Five of the seven specifically-claimed compounds in Mooradian '952 include 3-dimethylamino while only one compound includes a 3-methylamino substituent. (DTX-1019 col.64 ll.20-33.) Thus, Mylan has failed to demonstrate by clear and convincing evidence that the 3-methylamino-6-carboxamido-1,2,3,4-tetrahydracarbazole (claim 1) is obvious in light of Mooradian '952.

Likewise, nothing in Mooradian 1977 renders the frovatriptan compound obvious to a POSA. The underlying premise of Mooradian 1977 was that "3-aminocarbazoles might have central nervous system activity paralleling the tryptamine types." (DTX-1082 at 487.) The authors prepared and studied a variety of 3-substituted amino-1,2,3,4-tetrahydracarbazole compounds, including compounds with 3-methylamino and 3-dimethylamino substituents. (See DTX-1082 at 487-88.) Thus, as with Mooradian '952, Mooradian 1977 teaches a preference for a 3-dimethylamino substituent. In testing ptosis prevention, Compound 3, a

dimethylamino, showed approximately three times the activity level of Compound 2, a methylamino. (DTX-1082 at tbl. II; see also Johnson Tr. 882:6-12.) Notably, as the authors explained, "It became apparent that 3 (Table II) [the dimethylamino] was the most interesting CNS compound in the series and this compound was studied in great detail." (DTX-1082 at 487; Johnson Tr. 1138:19-1139:10.)[28] Dr. Johnson agreed that Mooradian was "really highlighting compound three" in this paragraph. (Johnson Tr. 1138:19-1139:10; see also Johnson Tr. 902:14-17 (activity results in ptosis assay "showed a Mooradian preference for the dimethylamino").) Because the Mooradian references reflect a clear preference for the dimethylamino substituent, it is unclear why a POSA would be motivated to modify a 3-methylamino-tetrahydrocarbazole.

Mooradian 1977 also does not teach or express any preference for a 6-carboxamido substituent, which Dr. Johnson concedes. (Johnson Tr. 753:15-20.)[29] Table III of Mooradian 1977

[28] As discussed infra, Table III consists entirely of 3-dimethylaminotetrahydrocarbazoles further reflecting Mooradian's focus on dimethylamino compounds. (See Rocco Tr. 1634:6-11 ("So what Dr. Mooradian, being informed from his experiments from table 2, has now fixed this to the dimethylamino since that looked to be the compound that was particularly active . . . .").)

[29] See also Johnson Tr. 754:5-14 ("A class of molecules that were not in the 1977 paper were specifically carboxamido group . . . .").

is entirely devoted to substitutions at the 6- and 8- positions of the 3-dimethylamino-tetrahydrocarbazole structure, but none of these substitutions is a 6-carboxamido group. (See DTX-1082 tbl. III.) Furthermore, the authors concluded that with the exception of two compounds containing substitutions at the 8-position, none of the listed compounds were as potent as the original unsubstituted 3-dimethylamino-tetrahydrocarbazole. (DTX-1082 489-90 & tbl. III.) Mylan does not persuasively explain how a POSA reviewing this reference would find it obvious to modify the 3-aminotetrahydrocarbazole by adding a 6-carboxamido group.[30] Mooradian '952 does not assist Mylan in this regard because, as explained above, the Court rejects Mylan's contention that Mooradian '952 teaches a preference for the 6-carboxamido group among the numerous permissible substituents along the left side of the tetrahydrocarbazole ring system set forth therein.

[30] To the extent Mylan relies upon 5-CT as teaching the addition of a 6-carboxamido group for improved selectivity, the Court finds that any motivation to combine these elements is undermined by the authors' comments regarding the reduced potency of such a substitution. Moreover, the testimony cited by Mylan as validating the principle that a POSA would view the 6-carboxamido group (which is ostensibly similar to the 5-carboxamido group of 5-CT) as providing selectivity for the 5-HT_1-like receptors does not substantiate this view. Rather, Dr. King was asked if 5-CT was preferred over 5-HT and not specifically about the functions of a 6-carboxamido group. (See King Tr. 283:3-284:14.) In any event, Mylan failed to persuasively demonstrate that a carboxamido group on a different core structure would exhibit identical properties.

In addition, the types of activities disclosed in Mooradian '952 and Mooradian 1977 would direct a POSA who was pursuing a novel 5-HT_1-like agonist away from utilizing the 3-amino-tetrahydrocarbazole. (See Rocco Tr. 1635:12-23.) Neither Mooradian reference explicitly discusses utility of the compounds as 5-HT_1-like agonists or in the treatment of migraine.[31] (See, e.g., Johnson Tr. 897:3-5 (noting nothing in Mooradian '952 is addressed to 5-HT_1-like receptors).) Nor do the Mooradian references mention serotonin.[32] (See Johnson Tr. 893:14-894:4, 894:19-895:5, 897:3-8.)

The Mooradian '952 compounds exhibited "analgetic and psychotropic activities" as well as, in some cases,

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[31] See Rocco Tr. 1621:9-16 ("Q. Is there anything in the Mooradian '952 patent that indicates any of these compounds would have utility for migraine treatment? A. No, it does not. Q. Is there anything in the Mooradian '952 patent that would counsel somebody of skill in the art in 1991 to make a migraine treatment? A. No."); Rocco Tr. 1857:25-1858:2 (nothing in Mooradian 1977 "teaches toward migraine, nothing teaches toward serotonin, nothing teaches toward serotonin 1B, 1D or 1F or anything"); Nelson Tr. 1271:5-7 ("I could find no evidence in [Mooradian '952 or Mooradian 1977] that these tetrahydrocarbazoles in fact interacted with serotonin systems at all.").

[32] Nelson Tr. 1277:20-1278:8 ("Q. Doctor Nelson, on the whole, what do these references teach regarding the activities of 3-amino tetrahydrocarbazoles that were appreciated at the time of the invention? A. Yeah, from my reading of this literature, I don't see any evidence that would lead one to suspect that these compounds had any activities on serotonin-containing systems in the body. . . . [B]ut we have no evidence that suggests that they interact with serotonin systems from these publications.").

antihistaminic activity. (DTX-1019, at [57].) Mylan contends that because '952 mentions analgetic activities and the disclosed compounds are structurally similar to 5-HT, a POSA would have deemed these compounds to be suitable as anti-migraine agents. However, a reference to analgetic properties refers to ameliorating pain "[i]n a very broad non-specific, non-mechanistic way" and thus would not be interpreted as teaching to migraine or serotonergic activity. (Rocco Tr. 1801:25-1802:9.) Mylan did not seriously dispute that although analgesics may be used in connection with migraine treatment, analgetic compounds are not a specific migraine treatment that targets the mechanics or causes of migraine. Therefore, a POSA would be unlikely to view such non-specific analgetic activity as a motivation to modify a 3-amino-tetrahydrocarbazole and create a migraine or 5-HT_1-like agonist compound.

Moreover, Mooradian '952 measured analgetic activity using a "crude screening tool" known as a phenylquinone-induced writhing assay, which involved injecting phenylquinone into the abdominal cavity of rodents. (DTX-1019 col.17 ll.15-35; Nelson Tr. 1274:19-21.) However, as Dr. Nelson testified certain deficiencies in this test, such as false positives, had long been recognized in the art. (Nelson Tr. 1274:9-25; see also PX-

0130[33] at 240.) One type of compound that results in a false positive are antihistamines, which are not deemed analgesics. (See Nelson Tr. 1276:3-8 (citing PX-0130 at 240).) Thus, Dr. Nelson concluded that "it might not be unexpected if antihistamines are positive in this writhing test that the carbazoles [in the Mooradian references] would also be positive in this writhing test" in light of Mooradian's recognition that some of the compounds exhibited antihistaminic activity. As a POSA would be aware that antihistamines provide a false positive in a writhing assay, it is not clear that a POSA would even attribute much weight to these results in terms of any purported analgetic properties of the disclosed 3-amino-tetrahydrocarbazoles. (See Nelson Tr. 1276:16-25.)

Mooradian '952 also tested compounds for psychotropic activity using an assay that evaluated whether a compound inhibited or reversed reserpine-induced ptosis.[34] (DTX-1019 col.17 ll.19-35.) Dr. Johnson testified that since the 1960s it was known that reserpine could trigger migraine, and therefore the ptosis assay would suggest to a POSA some utility in using

[33] L.C. Hendershot & Janet Forsaith, Antagonism of the Frequency of Phenylquinone-induced Writhing in the Mouse by Weak Analgesics and Nonanalgesics (Sept. 19, 1958).

[34] Ptosis referred to drooping of the eyelids, which was effected through the administration of reserpine. (See, e.g., Johnson Tr. 680:4-9.)

tetrahydrocarbazoles in treating migraine. (Johnson Tr. 680:14-17 (discussing PX-0394[35] at 149).) However, in that same publication, the authors noted that "reserpine-induced headache is qualitatively different to [sic] a migraine attack." (PX-0394 at 149.) Moreover, by 1991, it had been determined that "there was no involvement of serotonin depletion caused by reserpine in this phenomenon of ptosis." (Nelson Tr. 1271:21-1274:4 (citing PX-0188 at 514).) This would suggest that the reserpine assay would not be relied upon by a POSA as an indication of anti-migraine activity. In fact, Dr. Nelson testified that he was unaware of anyone using reserpine-induced ptosis to evaluate compounds for migraine efficacy. (Nelson Tr. 1274:5-7.) Dr. Johnson, who himself has never used this assay to test compounds for potential use in migraine, also acknowledged that this assay has never been identified as having a specific relationship to migraine. (Johnson Tr. 892:7-14.)[36]

Regardless, that the Mooradian '952 compounds exhibited antihistaminic activity would discourage a POSA, and therefore teach away, from the use of the 3-amino-tetrahydrocarbazoles in

[35] PX-0394 (Merton Sandler & Geralyn M. Collins, Migraine: A Spectrum of Ideas (1990)).

[3636] Admittedly, there are no whole animal behavioral models to test for migraine. Rather, many mechanistic tests have been relied upon as substitutes. (See, e.g., Johnson Tr. 892:23-893:3.)

the treatment of migraine due to the sedative effect of antihistamines. (Rocco 1804:19-1805:3 (“In fact, a lot of drug discovery effort goes into preventing compounds with antihistaminic activity from getting into the brain.”); Nelson Tr. 1278:9-17 (“I think what one would have known about tetrahydrocarbazoles would have made one reluctant to go in that direction because you wouldn’t want an anti-migraine drug that had the side effects of an antihistamine or of a D-2 receptor antagonist. So I think it actually teaches away from using the carbazoles.”).) See Tec Air, Inc. v. Denso Mfg. Mich., Inc., 192 F.3d 1353, 1360 (Fed. Cir. 1999) (noting a reference “teaches away” when a POSA would be discouraged from following the path of the reference or would be led in a different direction).

For similar reasons the reported activities of the Mooradian 1977 compounds, which were tested for their antidepressant and antipsychotic activity, would not suggest the use of 3-amino-tetrahydrocarbazoles for treatment of a condition wherein a 5-HT_1-like agonist is indicated or migraine. Specifically, the Mooradian 1977 compounds were evaluated in terms of their “chlorpromazine-like” and “imipramine-like activity,” and the authors concluded that “some of the compounds appear to exhibit both chlorpromazine-like and imipramine-like activity, others only chlorpromazine-like, and others only imipramine-like activity.” (DTX-1082 at 489.) Chlorpromazine was

developed to treat schizophrenia, while imipramine was a depression and anxiety drug. (Johnson Tr. 877:3-21.) Neither of these drugs were used to treat migraine. (Id.) In evaluating chlorpromazine-like activity, the authors tested "prevention of reserpine-induced ptosis in mice" as an "index of antidepressant activity." (DTX-1082 at 489, 491; see also Johnson Tr. 890:13-15.) And in evaluating imipramine-like activity, the authors tested the compounds for "[p]revention of d-amphetamine-induced stereotypes behavior in rats" as an "index of antipsychotic activity." (DTX-1082 at 489; see also Johnson Tr. 890:18-891:2.) In terms of the ptosis assay, the authors reported that many of the listed compounds were inactive, meaning they did not prevent ptosis. (DTX-1082.) Mylan's experts failed to convincingly demonstrate why a POSA would have been motivated to explore these compounds as 5-HT_1-like agonists on the basis of these activities. Rather, Mylan once again relies upon the results of the reserpine-induced ptosis assay as indicative of anti-migraine activity. However, as discussed above, any connection between reserpine and serotonin, which had become the focus of migraine treatment as of the priority date, had been soundly discredited.

Mylan also attempts to rely on the fact that the Mooradian 1977 compounds were posited as having "central nervous system activity paralleling the tryptamine types." However, the Court

is persuaded by Endo's argument that this general statement alone would not indicate utility in a migraine treatment or indicate activity at the relevant serotonin receptors. This is because serotonin is just one "typtamine-type" molecule, and "tryptamine-type" activity can include activity at any serotonin receptor, which may encompass a broad range of biological activities. (See Johnson Tr. 889:8-15.) Moreover, not all "tryptamine analogs" will be 5-HT_1-like agonists. (See, e.g., Peroutka Tr. 624:24-625:18.)

In sum, the Court finds the testimony of Drs. Rocco and Nelson to be credible and persuasive, and determines that as of the priority date, a POSA would not have been motivated to make and modify or create a tetrahydrocarbazole compound for migraine treatment. (See Rocco Tr. 1692:9-12.) Even when the Mooradian references are considered in combination with the knowledge of a POSA, Mylan has failed to produce clear and convincing evidence that a POSA would have reason to ignore the clear preference for a dimethylamino substituent, and then add a 6-carboxamido substituent when Mooradian 1977 suggests that 6-position substituents decreased potency. (See Rocco Tr. 1636:2-6); see also Arkie Lures, Inc. v. Gene Larew Tackle, Inc., 119 F.3d 953, 957 (Fed. Cir. 1997) ("It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion, in the

prior art, to combine the elements."). Even assuming that a POSA would have reason to combine the elements to create frovatriptan, Mylan has failed to convincingly demonstrate why a POSA would have utilized any such compound in the treatment of a condition wherein 5-HT_1-like agonist is indicated or migraine in light of the biological activity data provided in the Mooradian references. See Sandt Tech., Ltd. v. Resco Metal & Plastics Corp., 264 F.3d 1344, 1356 (Fed. Cir. 2001); 35 U.S.C.A. § 282(a) (West 2012) ("[D]ependent claims shall be presumed valid even though dependent upon an invalid claim.").

2. A POSA Would Not Have Used 5-CT as a Lead Compound as of the Priority Date

Mylan also argues that the claims are obvious pursuant to a structural obviousness analysis wherein a POSA would have selected 5-CT as the lead compound. "Proof of obviousness based on structural similarity requires clear and convincing evidence that a medicinal chemist of ordinary skill would have been motivated to select and then to modify a prior art compound (e.g., a lead compound) to arrive at a claimed compound with a reasonable expectation that the new compound would have similar or improved properties compared with the old." Daiichi Sankyo Co., Ltd. v. Matrix Labs., Ltd., 619 F.3d 1346, 1352 (Fed. Cir. 2010) (affirming district court's finding that asserted claims were not obvious under structural obviousness analysis because

defendant failed to demonstrate POSA would have chosen compounds as lead compounds), cert. den'd, 131 S. Ct. 1678 (2011). This two-part analysis looks, first, to whether a POSA would have selected the asserted prior art compound as a lead and, second, whether the prior art provided a POSA with a reason or motivation to modify the lead compound to create the claimed compound with a reasonable expectation of success. See Otsuka Pharm. Co., Ltd. v. Sandoz, Inc., 678 F.3d 1280, 1291-92 (Fed. Cir. 2012), cert. den'd, 133 S. Ct. 940 (2013). The choice of lead compound is based upon evidence of the relevant chemical properties, including any "positive attributes such as activity and potency" as well as any negative properties or adverse side effects. See id. (citations omitted); Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd., 492 F.3d 1350, 1359 (Fed. Cir. 2007) ("Significantly, the closest prior art compound (compound b, the 6–methyl) exhibited negative properties that would have directed one of ordinary skill in the art away from that compound. . . . The evidence showed that it was not obvious to try."). Mylan bears the burden of proof, and cannot meet its burden merely by pointing to structural similarities between the claimed compound and the potential lead compound. Daiichi Sankyo Co.., 619 F.3d at 1354 ("[P]roving a reason to select a compound as a lead compound depends on more than just structural similarity, but also knowledge in the art of the functional properties and

limitations of the prior art compounds." See [Eli Lilly & Co. v. Zenith Goldline Pharms., Inc., 471 F.3d 1369, 1377–79 (Fed. Cir. 2006)]. Potent and promising activity in the prior art trumps mere structural relationships.").

Mylan contends that several prior art publications teach the choice of 5-CT as the lead compound and that a POSA starting with 5-CT would have found it obvious to conformationally constrain 5-CT to form the tetrahydrocarbazole in a single step, followed by routine methylation to obtain frovatriptan. However, the Court finds that while the discovery of 5-CT may have initially represented an advance in the field of migraine, the subsequent development of sumatriptan reflected a significant shift in the field such that a POSA desiring to create a 5-HT_1-like agonist or anti-migraine compound would have chosen sumatriptan as the lead compound.

A lead compound is considered the starting point for further development of a pharmaceutical compound, and is chosen based upon an evaluation of certain characteristics including "indications of potency and efficacy and selectivity and, of course, chemical modifiability" as well as the compound's safety profile. (Johnson Tr. 794:5-12, 787:8-24; accord Johnson Direct Slide 49; Rocco Tr. 1640:20-1641:3, 1644:6-1646:19); see also Otsuka, 678 F.3d at 1291. A drug's potency refers to the amount of the compound required to effect a biological response when

the compound interacts with a particular receptor. (See Rocco Tr. 1644:14-20.) Efficacy indicates whether the compound alleviates a condition or otherwise causes the desired functional activity. (See Rocco Tr. 1644:23-1645:5; Johnson Tr. 787:14-16.) Selectivity refers to the extent a molecule prefers one targeted receptor to the exclusion of another. (See Rocco Tr. 1645:7-10.) And, modifiability refers to whether a chemist can easily vary chemical segments so as to improve any shortcomings. (Rocco Tr. 1646:7-16; accord Johnson Tr. 787:19-24.) In lead compound selection, none of these factors are considered in isolation. (See Rocco Tr. 1643:22-1644:5; Johnson Tr. 794:5-12; Johnson Direct Slide 49.)

Mylan's argument that 5-CT would be chosen as the lead compound prioritizes potency to the exclusion of any other desired characteristics and fails to account for any unwanted side effects. For example, Mylan relies upon Connor 1989 as support for its conclusion that a POSA would choose 5-CT as a lead compound. (See DTX-1216[37] at 379.) In that article, the authors determined that 5-CT was the most potent agonist for contracting canine and primate basilar arteries. (Id.) However, the article also stated that 5-CT's "contractile effect" in the

[37] H.E. Connor et al., Characterization of 5-HT receptors mediating contraction of canine and primate basilar artery by use of GR43175, a selective 5-HT_1-like receptor agonist, 96 Br. J. Pharmacol. 379 (1989) ("Connor 1989").

canine basilar artery was "small" compared to sumatriptan but that both agonists produced a similar maximum response in the primate basilar artery. (Id. at 384.) Mylan ignores these qualitative findings, focusing instead on quantitative potency data, thus undermining its argument.

Of even greater significance, however, Mylan's lead compound arguments contravene the evidence submitted at trial, which shows the shifting tides in the fields of 5-HT_1-like agonists and migraine treatment. A review of Glaxo's work on classification of 5-HT receptors was published in 1990 by Humphrey et al. (PX-0394[38].) It described that, by the early 1980s, Glaxo's attempt to identify 5-HT receptor subtypes led to the identification of 5-CT, "which appeared to be a very potent and selective agonist for the receptor in the dog saphenous vein." (See PX-0394 at 152 (citation omitted).) As Dr. Nelson explained, Glaxo's work on 5-CT "opened up a way to study a particular family of serotonin receptors, the 5-HT_1 family of receptors." (Nelson Tr. 1193:4-13.) However, Humphrey 1990 reported that Glaxo had begun to move away from 5-CT because it was discovered that 5-CT exhibited "marked hypotensive properties in vivo owing to an even more potent activation of a

[38] P.P.A. Humphrey et al., 5-HT in migraine: evidence from 5-HT_1-like receptor agonists for a vascular aetiology, in MIGRAINE: A SPECTRUM OF IDEAS 147 (1990) ("Humphrey 1990").

5-HT receptor type which mediated vasodilation." (PX-0394 at 152 (citation omitted); see id. at 157.) Glaxo therefore "continued to make tryptamine analogues in the belief that [it] might identify a tryptamine agonist which stimulated only one of these 5-HT_1-like receptors–the one which mediates the vasoconstrictor action of 5-HT in the dog saphenous vein." (PX-0394 at 152.) This research led to the development of AH25086 and sumatriptan, identified in some literature as GR43175,[39] which displayed a preferred selectivity profile. (See id. at 152-153; Nelson Tr. 1198:23-1199:10; see generally Nelson Tr. 1193:14-1197:4; see also Johnson Tr. 915:20-22 ("Glaxo rejected 5-CT as the compound for development and instead moved forward with two other compounds, correct? A. It appears so.").)

Dr. Rocco persuasively testified that, as of the priority date, a POSA would not have chosen 5-CT as the lead compound in light of the discovery of sumatriptan.[40] (See Rocco Tr. 1641:21-25, 1643:22-1644:5.) Sumatriptan was considered by the art to be a pivotal discovery in the field of migraine. (See, e.g., DTX-

[39] Rocco Tr. 1663:6-7.

[40] Mylan challenges Dr. Rocco's opinions as improperly based upon consideration of triptans that were marketed after the priority date. (See Rocco Tr. 1841:19-22.) However, Dr. Rocco explained that these post-priority date references were "meant to highlight and show the trajectory, the evolution of the field" and did not affect his opinion as to what a POSA would understand as of the priority date. (Rocco Tr. 1937:14-1938:1.) The Court finds this testimony credible.

1380[41] at S10 ("The development of sumatriptan revolutionized the acute treatment of migraine and led to the availability of a number of other triptans.").) For example, in 1988, Doenicke et al. reported the results of human clinical studies on sumatriptan and concluded that the novel compound "may represent an important advance in the treatment of acute migraine." (DTX-1382[42] at 1309.) Dr. Johnson agreed with this assessment (Johnson Tr. 915:5-12), and acknowledged that Doenicke 1988 created a "buzz" in the field about sumatriptan (Johnson Tr. 911:21-22). (See also PX-0394 at 160 ("Excitingly, the more detailed clinical evaluation of GR43175 has shown it to be very effective in aborting an acute migraine attack also when administered subcutaneously and orally . . . ." (citations omitted)); id. at 163 (sumatriptan "promises to provide a major breakthrough in the migraine therapy") (citations omitted).) Thus, "by the time of the priority date [] 5-CT was passé as . . . a lead []

[41] Patrick P.A. Humphrey, The Discovery of a New Drug Class for the Acute Treatment of Migraine, 47 Headache S10 (April 2007) ("Humphrey 2007"). Although this publication was printed long after the priority date, the Court may properly rely upon this article as describing the state of the art as of the priority date. Plant Genetic Sys., N.V. v. DeKalb Genetics Corp., 315 F.3d 1335, 1344 (Fed. Cir. 2003) ("'This court has approved use of later publications as evidence of the state of art existing on the filing date of an application.'" (citations omitted)).

[42] Alfred Doenicke et al., Possible Benefit of GR43175, a Novel 5-HT_1-like Receptor Agonist, for the Acute Treatment of Severe Migraine, Lancet 1309 (June 11, 1988) ("Doenicke 1988").

molecule for development of a new [] migraine entity." (See Nelson Tr. 1191:25-1192:3.)

The Court finds the testimony of Endo's experts to be persuasive and supported by the evidence, which demonstrates that as of the priority date the field of migraine had undergone a sea change through the discovery and testing of sumatriptan. Dr. Rocco opined that a medicinal chemist "would start with sumatriptan because sumatriptan embodies the knowledge that got you from 5-CT to that selective potent agent that had efficacy in the clinic [i.e., sumatriptan]." (Rocco Tr. 1651:15-20.) Dr. Nelson further testified that a POSA looking to create a migraine treatment was "starting out after we were all aware of Sumatriptan's desirable properties and going back to 5CT would be like trying to sort of reinvent the wheel. You want to start with your wheel that you had and make it better." (Nelson Tr. 1197:5-9.) As of the priority date, sumatriptan had become the "gold standard molecule" and, accordingly, the choice of a lead compound in any further migraine development. (See Nelson Tr. 1191:4-10 ("Well, I think it's pretty clear at the time of the priority date that sumatriptan was that gold standard molecule. And if we wanted to be successful in the migraine market bringing a new drug, that we were going to have [to] produce a molecule that was as good, minimally as good as sumatriptan but hopefully better than sumatriptan in some way in its therapeutic

effects.").)[43] Mylan has failed to demonstrate why a POSA would have been motivated to ignore this significant breakthrough in favor of reverting back to 5-CT as a starting point for further development.

This is especially true in light of the availability of human clinical data for sumatriptan, which would be of particular significance to a POSA evaluating potential lead compounds. (See Rocco Tr. 1649:18-1650:2); Janssen Pharmaceutica N.V. v. Mylan Pharms., Inc., 456 F. Supp. 2d 644, 664 (D.N.J. 2006) ("The second problem with Defendants' approach is that it looks at the rat data to the exclusion of any other references, such as the extremely relevant and important human test data."). While human clinical studies were never conducted on 5-CT and it was never utilized as a migraine treatment (Peroutka Tr. 620:12-16),[44] publications reported the results of such studies on

[43] Mylan's citation to U.S. Patent No. 4,252,803 (filed Oct. 10, 1979), which covers 5-CT and related compounds, is unavailing. (DTX-1386, at [57]; Johnson Tr. 805:16-807:10.) This patent was issued in 1981, years prior to the discovery of sumatriptan with its greater selectivity properties that counseled away from 5-CT as a lead compound.

[44] Mylan places great weight on a study reflecting that 5-CT was 20 times more potent in contracting the human basilar artery tissue than sumatriptan. (See Johnson Tr. 804:17-805:3; DTX-1217 (Andrew A. Parsons et al., 5-HT_1-like receptors mediate 5-hydroxytryptamine-induced contraction of human isolated basilar artery, 96 Br. J. Pharmacol. 434-449 (1989) ("Parsons 1989")), at 436, tbl. 1.) But that article also suggests that those results for 5-CT were not "reproducible", which in turn undermines the reliability of such data. (DTX-1217 at 434; accord Rocco Tr. 1664:6-12 (noting reproducibility of results

sumatriptan as early as 1988.[45] (See Nelson Tr. 1193:14-1197:4; DTX-1382 at 1309.) Doenicke et al. reported that intravenous infusion of GR43175 (i.e., sumatriptan), a 5-HT_1-like agonist, "resulted in rapid and complete relief of symptoms" in 71% of migraine attacks and "improvement to a non-migrainous residual headache" in approximately 15% of the remaining attacks. (See DTX-1382 at 1309; see also Peroutka Tr. 550:9-25 (acknowledging "the bottom line was [sumatriptan] worked").)[46] The article further notes that treatment with sumatriptan was "well tolerated" and patients experienced minimal adverse side effects. (DTX-1382 at 1309.) Hence, as of the priority date sumatriptan had demonstrated qualities a POSA would look for in a potential migraine candidate—efficacy, tolerability, and minimal side effects in humans.[47] (Cf. Rocco Tr. 1643:22-1644:5.)

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would be important to a POSA, who would view this as assurance that the results are reliable and could be replicated in any further experimentation).)

[45] Sumatriptan was launched in 1993 in the United States under the brand name "Imitrex." (SF ¶ 22.)

[46] See also Johnson Tr. 911:23-912:9 (acknowledging other studies published in 1991 showed the efficacy of sumatriptan and noting in 1991 sumatriptan went on the market in one European country); Peroutka Tr. 620:3-9 ("Q. And as of 1991 it had been reported to be [an] extremely effective acute treatment of migraine and to cause minimal side effects, correct? A. Correct. Q. And as of 1991 it was in Phase 3 clinical trials in the U.S. with promising results, correct? A. Correct.").

[47] Mylan also cites evidence concerning sumatriptan's low oral bioavailability and relatively short duration of action as further evidence why 5-CT would be the chosen lead compound. Dr. Johnson testified, however, that "5-CT is a fairly polar

In addition, several of the prior art publications on which Mylan relies underscore the negative vasodilation effects of 5-CT, which would counsel a POSA away from its selection as a lead compound. See Alphapharm Pty., Ltd., 492 F.3d at 1357-60 (finding compound was not lead where prior art taught negative side effects). Under the vascular hypothesis of migraine, it was believed that "dilated cranial blood vessels gave rise to migraine" and that by constricting those blood vessels through activation of certain receptors, one could alleviate migraine. (See Rocco Tr. 1641:10-18.) For instance, Connor 1989 showed 5-CT to be a "potent agonist at the 5-HT_1-like receptor mediating relaxation in cat saphenous vein and porcine vena cava, through a direct effect on the vascular smooth muscle," contrary to sumatriptan. (DTX-1216 at 384-85 (emphasis added and internal citations omitted).)[48] As Dr. Rocco opined, a POSA selecting a potential lead compound would "want to avoid the [compound]

molecule so it isn't going to pass membranes terribly well," which "from the point of view of developing a drug, [is] a serious drawback." (Johnson 789:7-15.) It also has low lipophilicity and reduced oral bioavailability, which would also be considered negative attributes in a potential drug. (See Johnson 790:-17.)

[48] See also PX-0394 (noting 5-CT "had marked hypotensive properties in vivo owing to an even more potent activation of a 5-HT receptor type which mediated vasodilation"); PX-0198 at 201, tbl.1 (noting 5-CT, unlike sumatriptan, caused "vascular smooth muscle relaxation, hypotension, [and] tachycardia in the cat").

that's mediating the thing that you're trying to avoid in the first place or trying to mitigate [vasodilation or vasorelaxation]." (Rocco Tr. 1662:6-18; see also id. 1669:19-25 (explaining "vascular smooth muscle relaxation" means "dilation of a blood vessel" which would be inconsistent with a migraine treatment).) Similarly, Saxena 1985 demonstrated certain vasodilation effects of 5-CT. (DTX-1080[49] at 533.) Dr. Saxena hypothesized that the arteriovenous anastomoses is dilated too much in migraine and that constricting the anastomoses could have an anti-migraine effect. (See Johnson 796:12-800:11.) He concluded that 5-CT constricted arteriovenous anastomoses but dilated arterioles. (DTX-1080 at 533.) However, the authors also acknowledged "[v]asodilation was observed in several tissues" for 5-CT, and that 5-CT caused an increase in conductance which can be indicative of increase in blood flow in the cerebral hemisphere. (DTX-1080 at 533, 540; see Rocco Tr. 1684:7-1685:25.) When starting with the hypothesis that migraine is caused by too much cerebral blood flow, and data suggests that 5-CT may increase cerebral blood flow, it is hard to see why a POSA would choose this compound as a lead compound after

[49] Pramod R. Saxena & Pieter D. Verdouw, 5-Carboxamide tryptamine, a compound with high affinity for 5-hydroxytryptamine$_1$ binding sites, dilates arterioles and constricts arteriovenous anastomoses, 84 Br. J. Pharmac. 533 (1985) ("Saxena 1985").

sumatriptan was discovered. (See also DTX-1469[50] at tbl. 1 (noting "smooth muscle relaxation" effect of 5-CT).)

Although Dr. Johnson testified that some dilation or vascular smooth muscle relaxation would not necessarily deter a POSA from selecting 5-CT as the lead compound, available data suggested that blood flow in the cerebral hemisphere remained relatively flat with 5-CT treatment. (Johnson Tr. 935:12-23, 936:23-937:3; DTX-1080 at 537; see also Rocco Tr. 1684:13-24 (noting cerebral blood flow remained flat).) Dr. Johnson did not adequately explain why a POSA interested in affecting blood flow issues in the brain would choose 5-CT in the face of this data when vasodilation of other areas had been observed.

In addition, sumatriptan demonstrated greater selectivity among the 5-HT_1-like receptors than 5-CT. Both parties agree that 5-CT is a non-selective agonist of the entire 5-HT_1 family of receptors, meaning that it binds to all 5-HT_1 receptors. (See, e.g., PX-0198[51] at 201, tbl. 1; see also Johnson Tr. 1120:23-24 (noting 5-CT "works at all 5-HT_1-like subtypes").) In fact, 5-CT was used to define the 5-HT_1 receptor family: the 5-HT receptors

[50] P.B. Bradley et al., Commentary: Proposals for the Classification and Nomenclature of Functional Receptors for 5-Hydroxytryptamine, Neuropharm., Vol. 25, No. 6, 563 (1986) ("Bradley 1986").

[51] Pramod R. Saxena and Michel D. Ferrari, 5-HT_1-like receptor agonists and the pathophysiology of migraine, 10 TiPS 200 (May 1989) ("Saxena & Ferrari 1989").

that demonstrated greater sensitivity to 5-CT than to 5-HT were referred to as 5-HT_1-like receptors. (PX-0394 at 152 (citing DTX-1469); Rocco Tr. 1650:8-12.) 5-CT's lack of differentiation among the 5-HT_1-like receptors in part prompted Glaxo to continue making tryptamine analogs in the hope of identifying an agonist that targeted the 5-HT_1-like receptor responsible for mediating vasoconstriction. (PX-0394 at 152-53.) As noted, this work led to the development of sumatriptan, which became the new "gold standard molecule." Saxena & Ferrari 1989 demonstrated that 5-CT was an agonist for nearly all of the 5-HT_1-like receptors, while sumatriptan showed selectivity for what the authors identified as the 5-HT_{1x} receptor subtype.[52] (PX-0198 at 201, tbl. 1.) It is undisputed that as of the priority date a POSA would understand the 5-HT-$_{1B}$ and 5-HT-$_{1D}$ receptors to be of interest in the treatment of migraine, but there is also some evidence that the 5-HT-$_{1A}$ could not be definitively ruled out as relevant. (See, e.g., Peroutka Tr. 546:19-547:19; Rocco 114:16-21, 144:20-145:7.)

Mylan's focus on the claim language in the '864 Patent referring to 5-HT_1-like agonists, without differentiation among any subtypes, is misplaced. The evidence overwhelmingly

[52] At that time, the 5-HT_1 receptor subtypes had not been fully identified; hence the authors referred to the two as-yet-unnamed 5-HT_1-like receptor subtypes as 5-HT_{1x} and 5-HT_{1y}. (Rocco Tr. 1666:8-1667:6.)

demonstrated that the state of the art as of the priority date had already moved away from 5-CT in particular, and toward sumatriptan, a compound that had been proven in clinical trials to be safe and effective without the unwanted side effects of 5-CT.

Although Mylan correctly notes that the prior art may suggest multiple compounds as lead compounds, that does not change Mylan's burden to demonstrate by clear and convincing evidence that a POSA would have chosen 5-CT after sumatriptan. See Daiichi Sankyo Co., 619 F.3d at 1354 ("While the lead compound analysis must, in keeping with KSR, not rigidly focus on the selection of a single, best lead compound, see [Altana Pharma AG v. Teva Pharms. USA, Inc., 566 F.3d 999, 1008 (Fed. Cir. 2009)], the analysis still requires the challenger to demonstrate by clear and convincing evidence that one of ordinary skill in the art would have had a reason to select a proposed lead compound or compounds over other compounds in the prior art. Here, the district court did not commit error, let alone clear error, in finding that Mylan failed to meet that burden."). Here, Mylan has failed to persuasively demonstrate that a POSA would choose 5-CT over a successor compound with greater selectivity and proven efficacy in human clinical trials. See Arkie Lures, 119 F.3d at 957-58 ("The question

is . . . whether it was obvious to do so in light of all the relevant factors.").[53]

3. Secondary Considerations

The final Graham factor addresses secondary considerations, which may be used to rebut a prima facie showing of obviousness. Ormco Corp. v. Align Tech., Inc., 463 F.3d 1299, 1311 (Fed. Cir. 2006) (citing WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1359 (Fed. Cir. 1999); In re Kahn, 441 F.3d 977, 985-86 (Fed. Cir. 2006)). These considerations include "commercial success, long felt but unsolved needs, failure of others, etc., [which] might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented" and "may have relevancy" as indicia of obviousness or nonobviousness. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966). In light of the Court's determination that Mylan has failed to meet its burden of demonstrating prima facie obviousness, the Court need not consider these indicia of nonobviousness. See Takeda Chem. Indus., Ltd. v. Alphapharm

[53] Mylan's alleged "real world evidence" that 5-CT was in fact the chosen lead compound for development of sumatriptan and frovatriptan does not alter this Court's analysis. See Daiichi Sankyo Co., 619 F.3d at 1354 ("[T]he attribution of a compound as a lead compound after the fact must avoid hindsight bias; it must look at the state of the art at the time the invention was made to find a motivation to select and then modify a lead compound to arrive at the claimed invention." (original emphasis)).

Pty., Ltd., 492 F.3d 1350, 1363 (Fed. Cir. 2007) ("In light of our conclusion that Alphapharm failed to prove that the claimed compounds would have been prima facie obvious, we need not consider any objective indicia of nonobviousness."); Otsuka Pharm. Co., Ltd. v. Sandoz, Inc., 678 F.3d 1280, 1296 (Fed. Cir. 2012) ("Because we agree with the district court that the Defendants failed to prove that claim 12 of the '528 patent would have been prima facie obvious over the asserted prior art compounds, we need not address the court's findings regarding objective evidence of nonobviousness.").

Accordingly, the Court finds that Mylan has failed to meet its burden of demonstrating by clear and convincing evidence that the claims of the '864 Patent are invalid as obvious. Cf. AstraZeneca LP v. Breath Ltd., No. 08-1512, 2013 WL 1385224, at *10-*26 (D.N.J. Apr. 03, 2013) (finding claims invalid as obvious), overruled on other grounds No. 2013-1312, 2013 WL 5813759 (Fed. Cir. Oct. 30, 2013).

C. Written Description and Enablement

Mylan also argues that the asserted claims of the '864 Patent are invalid under 35 U.S.C. § 112 for failure to provide an adequate written description and lack of enablement of the full scope of the claims. In particular, Mylan maintains that the U.K. application and the '864 Patent fail to describe and enable (1) the separation of the enantiomers of frovatriptan;

(2) the salt-hydrate of frovatriptan; or (3) the treatment of migraine that is expected to present. Citing to certain statements SKB made to the PTO during prosecution of the Borrett Patents, Mylan argues that Endo should be judicially estopped from asserting that the U.K. application and the '864 Patent disclose and enable "the specific R(+)-enantiomer of frovatriptan, or its particular salt-hydrate form." (Mylan's Br. Regarding Endo's Inconsistent Positions ("Defs.' J.E. Br."), Dkt. Ent. 192 at 1.) The Court first addresses Mylan's judicial estoppel argument.

1. Endo Will Not Be Judicially Estopped Based Upon Statements SKB Made to the PTO in Connection With the Borrett Patents

During prosecution of the '501 Patent,[54] which contained claims directed to the R(+)-frovatriptan monosuccinate monohydrate compound, the PTO rejected certain claims "as constituting attempted non-statutory double patenting (obvious)" over claims of the '864 Patent that cover "the enantiomers of the 3-methylamino compounds". (DTX-1427 at MYL-FRO 0047551 (citing PX-0001 col.2 ll.36-38).) In response, SKB told the PTO that "None of the enantiomer, the particular salt form, or the

[54] Rodney C. Young is a named inventor on both the '864 Patent and the Borrett Patents. (DTX-1078, at [75]; DTX-1399, at [75]; PX-0001, at [75].) However, the Borrett Patents were filed after Dr. Young left SKB. (Dr. Rodney Young ("Young") Tr. 378:5-16.)

hydrate [of (+)-6-carboxamido-3-N-methylamino-1,2,3,4-tetrahydrocarbazole succinate monohydrate] were specifically disclosed in WO 93/00086."[55] (DTX-1427 at MYL-FRO 0047556.) SKB also submitted the declaration of Andrew Parsons, a senior biologist involved with the frovatriptan research team. (Id. at MYL-FRO 0047559-64.) Parsons declared that "WO 93/00086 . . . discloses the racemic mixture (Cmpd. 2 herein), 3-methylamino-6-carboxamido-1,2,3,4-tetrahydrocarbazole hydrochloride salt. Neither WO 93/00086, nor the '864 patent specifically teach the enantiomeric form of Cmpd. 2, or the specific salt form or the hydrate which is Cmpd. 1, claimed in this application." (Id. at MYL-FRO 0047563.)[56] Based upon SKB's representation, the PTO ultimately allowed the claims to proceed. (Id. at MYL-FRO 0047565-66.)

As discussed above, judicial estoppel is properly employed where (1) a party asserts irreconcilably inconsistent positions; (2) in bad faith; and (3) "judicial estoppel is tailored to address the affront to the court's authority or integrity." Dam

[55] International application publication no. WO93/00086, is the application that issued as the '864 Patent. (PX-0001, at [87].)

[56] Likewise, the '603 Patent characterizes WO93/00086 as describing the "3-N-methylamino-6-carboxamido-1,2,3,4-tetrahydrocarbazole (as the hydrochloride salt)," which was "obtained only as mixtures of enantiomers," and explains that the inventors "have now isolated the individual isomers." (DTX-1399 col.1 ll.40-50.)

Things from Denmark, a/k/a Troll Company ApS, v. Russ Berrie & Co., Inc., 290 F.3d 548, 559-60 (3d Cir. 2002) (internal quotations and citations omitted). For purposes of this analysis, the Court assumes that the position that SKB took before the PTO is inconsistent with the position that Endo now urges this Court to adopt.[57] The question then becomes whether this Court may judicially estop Endo from arguing that the '864 Patent describes and enables the frovatriptan enantiomers and salt-hydrate on the basis of SKB's prior statements to the PTO. The Court finds that it should not.

Mylan has submitted no evidence demonstrating that Endo expressly or impliedly adopted the statements made in connection with the Borrett Patents or has otherwise pursued the

[57] The Court is not persuaded that the two statements are inconsistent in all respects. First, it is true that the '864 Patent does not **specifically** teach the (R)-(+) frovatriptan in the particular salt-hydrate form in the detail set forth in the Borrett Patents. But that does not necessarily mean that a POSA would understand the inventor to not have possession of the subject matter. Nor does it mean that a POSA could not make and use the invention, including the (R)-(+) frovatriptan enantiomer in its salt-hydrate form, without undue experimentation based upon the patent specification. Second, Dr. Rocco noted that, in the pharmaceutical industry, process chemists will frequently file patents "on the perfected commercial ways" of creating a compound, which could explain why the later, more particularized, Borrett Patents were sought. (Rocco Tr. 1747:2-14.) Such an interpretation is borne out by many of the related GSK documents. (See, e.g., DTX-1398 ¶ 3 (Record of Invention) ("The resolution process has enabled the use of a short, 3-stage route to [frovatriptan]. Previously, this compound could only be prepared by N-methylation of SB-205555, a low yielding 8-stage process.").)

interpretation of the '864 Patent that is set forth therein. In fact, the evidence demonstrates just the opposite: Endo did not initially pursue an infringement action with respect to the Borrett Patents. Rather, it was Mylan that first raised the Borrett Patents as part of a counterclaim seeking a declaration of non-infringement and invalidity. (See Answer ¶¶ 19-28.) Endo then granted Mylan a covenant-not-to-sue on the Borrett Patents and, consequently, Mylan's counterclaim was dismissed.[58] (See Order of Dismissal, Dkt. Ent. 19.) Notably, Mylan has presented no evidence that Endo has ever pursued an action for infringement of the Borrett Patents against Mylan or any other party. The record thus suggests that Endo simply disagrees with SKB's later interpretation as to the teachings of the '864 Patent and has chosen to abandon that interpretation.

For similar reasons, the Court is not persuaded that the record reflects any evidence of bad faith on Endo's part in pursuing its current position. Mylan contends that bad faith can be inferred from the fact that inconsistent positions were taken. However, as discussed, Endo has never expressed agreement with that position and, absent such evidence, the Court does not

[58] Notably, the record does not demonstrate that this covenant-not-to-sue was entered into in bad faith. Rather, it seems to this Court that Endo made a deliberate choice to litigate the purportedly broader claims presented in the '864 Patent instead of pursuing the more limited claims set forth in the Borrett Patents.

infer bad faith. See Price v. Del. Dep't of Corr., 40 F. Supp. 2d 544, 556 (D. Del. 1999) (declining to apply judicial estoppel where no evidence of party's bad faith). Judicial estoppel is an equitable doctrine invoked at the court's discretion to protect the integrity of the courts and the judicial process. Montrose Med. Group Participating Sav. Plan v. Bulger, 243 F.3d 773, 779-80 (3d Cir. 2001).

The Court is also guided in part by Federal Circuit case law, which makes clear that statements made during the prosecution of a later, unrelated patent—such as the Borrett Patents—cannot be used to interpret claims of an earlier patent. See Pfizer, Inc. v. Ranbaxy Labs. Ltd., 457 F.3d 1284, 1290 (Fed. Cir. 2006); cf. Goldenberg v. Cytogen, Inc., 373 F.3d 1158, 1167-68 (Fed. Cir. 2004) (contents of another patent may not be used to construe claims of patent at issue absent a formal relationship or incorporation by reference of the other patent's terms); Abbot Labs. V. Dey, L.P., 287 F.3d 1097, 1103-06 (Fed. Cir. 2002) (statements made during prosecution of an earlier-filed patent do not create estoppel as to scope of claims of later-filed patent). The Court sees no reason this principle should not apply outside the context of claim construction.

Furthermore, the cases on which Mylan primarily relies do not support its position. In Alcohol Monitoring Systems, Inc. v.

ActSoft, Inc., No. 07-02261, 2011 WL 5075619 (D. Colo. Oct. 25, 2011), the earlier patent was assigned to one of the named inventors, Jeffrey Hawthorne, who was also a co-founder and Chief Technology Officer for plaintiff. Id. at *1. Hawthorne subsequently obtained an unrelated patent on a similar subject by making statements to the PTO that distinguished the claims of the later patent from those of the earlier patent. Id. at *1-2. In applying judicial estoppel, the court specifically noted the nexus between the parties asserting the allegedly inconsistent positions. Id. at *5 n.2 ("Plaintiff does not argue a lack of identity between the positions Hawthorne took in regard to the '940 application and positions plaintiff may now take in regard to Claim 14(e). . . . Moreover, given Mr. Hawthorne's position at plaintiff, there is no inequity in finding such identity."). No such identity of parties exists here.

MobileMedia Ideas, LLC v. Apple Inc., 907 F. Supp. 2d 570 (D. Del. 2012), is similarly inapposite. There the plaintiff claimed an earlier priority date for the patent at issue based upon an application for the '979 patent. Id. at 621. The court held that the plaintiff was judicially estopped from asserting a position on the scope of the '979 patent that was inconsistent with the position it took during prosecution of that same patent. Id. at 623. That is not the situation here.

For these reasons, the Court will not judicially estop Endo from asserting that the '864 Patent teaches the frovatriptan enantiomers and salt-hydrates.[59] The Court hastens to note, however, based on Endo's decision to pursue the '864 Patent in this litigation, Endo certainly would be estopped from pursuing either an inconsistent position on the teachings of the '864 Patent or the Borrett Patents in future litigation.

2. Legal Standards

Mylan also contends that the '864 Patent fails for lack of written description and enablement. In order to be valid, a patent must contain a written description of the invention that

[59] Endo also argues in its post-trial brief, consistent with the objections it set forth in the Pretrial Order, that the Borrett Patents and the Parsons Declaration are inadmissible hearsay. (See Ex. G, Dkt. Ent. 172.) Endo, however, failed to assert a timely objection when these documents were first admitted into evidence and has therefore waived any such objection. (See Tr. 307:8-308:2 (DTX-1078); Tr. 821:2-9 (DTX-1399, DTX-1078); Tr. 850:22-855:8 (DTX-1427); cf. Tr. 1743-61.) See Gov't of V.I. v. Archibald, 987 F.2d 180, 184 (3d Cir. 1993) ("If a party fails to object in a timely fashion, the objection is waived . . . ."). Further, to the extent Endo asserts that its objections to these documents fall within its ongoing objection to the "internal GSK and Vernalis documents," such argument is not supported by the record. First, the Borrett Patents and the Parsons Declaration were not listed among those internal GSK documents to which Endo objected, and they do not bear a GSK bates-stamp. Second, the Court instructed Endo of the importance of identifying the objected-to testimony so that the Court could identify it and Endo did not do so with respect to these particular documents until they were used with Dr. Rocco. (See Tr. 743:21-22 ("When those areas that you have an objection to are elicited, it would be important to lodge that objection.").)

"reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). This determination is a question of fact that requires an "objective inquiry into the four corners of the specification from the perspective of a [POSA]." Id.; see also GlaxoSmithKline LLC v. Banner Pharmacaps, Inc., No. 11-046, 2013 U.S. Dist. LEXIS 112440, at *10 (D. Del. Aug. 9, 2013). Factors to consider include "'the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.'" Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *11 (quoting Ariad Pharms., Inc., 598 F.3dat 1351).

Notably, the requisite level of detail "varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology." Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *10. The specification need not include "every conceivable and possible future embodiment of his invention." Takeda Pharm. Co. v. TWiPharms., No. C-11-01609, 2013 U.S. Dist. LEXIS 72958, at *67 (N.D. Cal. Apr. 8, 2013) (quoting Cordis Corp. v. Medtronic AVE, Inc., 339 F.3d 1352, 1365 (Fed. Cir. 2003)). Nor must it include information that is well known in the art. Id. (quoting Epistar

Corp. v. Int'l Trade Comm'n, 566 F.3d 1321, 1336 (Fed. Cir. 2009)).

In addition, 35 U.S.C. § 112 requires that a patent specification describe "the manner and process of making and using [the invention], in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use [the invention], and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention." 35 U.S.C. § 112(a). In other words, the specification must "enable a [POSA] to make and use the invention." Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *33. This requirement is met when, at the time of filing the application, a POSA, having read the specification, could practice the invention without "undue experimentation." Cephalon, Inc. v. Watson Pharms., Inc., 707 F.3d 1330, 1336 (Fed. Cir. 2013). To determine whether undue experimentation is required the court must weigh many factual considerations, including:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

Id. (citing In re Jack R. Wands, 858 F.2d 731, 737 (Fed. Cir. 1988)). Importantly, "'[i]t is unnecessary to spell out every detail of the invention in the specification' . . . and the patent application does not need to disclose specific examples corresponding to every claimed embodiment." Pfizer, Inc. v. Teva Pharmaceuticals U.S.A. Inc., 882 F. Supp. 2d 643, 682 (D. Del. 2012) (quoting Falko—Gunter Falkner v. Inglis, 448 F.3d 1357, 1366 (Fed. Cir. 2006)). Rather, there need only be a "'reasonable correlation' between the disclosure and the claims." Id. at 682-83 (quoting Invitrogen Corp. v. Clontech Labs., Inc., 429 F.3d 1052, 1071 (Fed. Cir. 2005)).

While written description and enablement are separate considerations, they "often rise and fall together." Ariad Pharms., Inc., 598 F.3d at1352. Mylan's written description and enablement arguments are based on its assertions that the U.K. application and the '864 Patent fail to describe and enable (1) the separation of the enantiomers of frovatriptan; (2) the salt-hydrate of frovatriptan; or (3) the treatment of migraine that is expected to present.

Before turning to the merits of these arguments, the Court must address Mylan's contention that the determination regarding written description and enablement must be made based upon the U.K. application alone because the '864 Patent claims priority to the filing date of the U.K. application. In response, Endo

essentially argues that Mylan waived its ability to contest whether the U.K. application describes and enables the full scope of the claims because the parties stipulated to a priority date of June 26, 1991. (See SF ¶ 34.) The Court does not agree with Endo's position.

First, although Mylan stipulated to a priority date of June 26, 1991, it seems to this Court that Mylan intended only to acknowledge the foreign application priority date listed on the front of the '864 Patent. (See PX-0001, at [30].) Indeed, Mylan's contested facts in the Pretrial Order foreshadow its written description and enablement arguments, including Mylan's position that the determination should be based on the U.K. application. (See Tab C of the Pretrial Order ¶¶ 295-98.)[60] Therefore, contrary to Endo's suggestion, Mylan is not now attempting "to walk-back this agreement." (Pl.'s Reply Post-Trial Br. ("Pl.'s Reply Br.") 15.) Second, a patent's "priority date" is a legal conclusion based upon questions of law, which in turn are based upon factual determinations. See Chiron Corp. v. Genentech, Inc., 363 F.3d 1247, 1253-54 (Fed. Cir. 2004). The Court will not find that Mylan stipulated to any underlying facts.

[60] See id. ¶ 298 ("Moreover, even if post-priority date portions of the specifications of the Patents-in-Suit that are not contained in the UK application are considered, the post priority added matter still does not enable a POSA . . . .").

In any event, the Court finds that Mylan has failed to demonstrate, by clear and convincing evidence, that either the U.K. application on its own or the '864 Patent fail to sufficiently describe or enable the asserted claims.

3. Compound of (general) formula (I)

During the claim construction phrase, Endo argued that "compound of (general) formula (I)" should be construed to mean any compound of formula (I) regardless of stereochemistry whereas Mylan sought a construction that included the compound's stereochemistry. (Claim Constr. Op. 8-9.) Although the parties agreed that "compound" includes "all R [enantiomers] and no S to all S and no R, and every ratio in between," Endo argued that Mylan's construction necessarily would impose limitations that were not intended by the applicants. (Id. at 9 (citations and quotations omitted).) Judge Irenas agreed with Endo and construed "compound of (general) formula (I)" in claim 1 of the '864 Patent to refer to the formula "without regard to stereochemistry." (Claim Constr. Op. 10.) Mylan now contends that because the claims were broadly construed, the U.K. application and the '864 Patent must specifically describe and enable the separation of the enantiomers of 3-methylamino-6-carboxamido-1,2,3,4-tetrahydrocarbazole.

Endo maintains, however, that Mylan's validity arguments misconstrue Judge Irenas' claim construction and therefore seek

to impose a heightened written description and enablement requirement. Endo cites to Pfizer, Inc. v. Teva Pharmaceuticals U.S.A. Inc., where the court similarly construed a claim to a chemical compound to mean the compound without reference to its stereochemistry. 882 F. Supp. 2d at 688. Defendant made the same arguments Mylan asserts here: the patent failed to satisfy the written description and enablement requirements because it did not describe how to obtain the enantiomers, reflect evidence of resolution or provide any characterizing data of the individual enantiomers, and the compound had been obtained only as a racemic mixture. Id. at 683-85, 700-01. The court rejected defendant's arguments.

In addressing enablement, the Pfizer court determined that the

> construction does not require the '692 application to enable each conceivable mixture of 3-isobutylGABA's enantiomers-including 'single optical isomer forms' or any other composition of that compound-in order to satisfy the requirements of § 112. [] Contrary to the defendants' assertions, where a court, as it has here, construes a claim to cover a chemical compound, the specification is not deficient merely because it does not disclose how to prepare a particular form of that compound.

Id. at 688 (citing In re Hogan, 559 F.2d 595, 606 (C.C.P.A. 1977) (internal citation omitted)). The court then determined that the relevant claim was enabled as the inventors indisputably invented the compound, the specification taught the

preparation of a racemic mixture of the compound, and the inventors had prepared the racemic compound. Id. at 689. It further found the written description "more than sufficient to convey to those of skill in the art the subject matter of the claimed invention and that the inventors were in 'possession of it.'" Id. at 702.

The same outcome is dictated here. Judge Irenas' construction did not include any stereochemical limitations and, therefore, the disclosure is not insufficient due to failure to describe how to obtain the particular (R)-(+) frovatriptan form of the compound.

It is not seriously disputed that frovatriptan is included among the compounds of formula (I) described in the U.K. application. (See DTX-1077 at 230.) The application explains that "a particularly preferred compound" is 3-amino-1,2,3,4-tetrahydrocarbazole-6-carboxamide, and then sets forth a process for the preparation of other novel compounds of formula (I). (DTX-1077 at 231; see also Rocco Tr. 1704:11-17.) The synthesis of this preferred compound is set forth in Example 2 of the application (and the '864 Patent). (DTX-1077 at 240-41; PX-0001 9:48-10:18.) Even Dr. Johnson agreed this compound could be converted to frovatriptan via a "routine," "very simple" methylation process, which is a "straightforward transformation in chemistry." (Johnson Tr. 812:25-813:21; Rocco Tr. 1742:7-17

(“I think when reading the specification of ‘864 [a POSA] would realize in one step, you can convert an advanced intermediate into R frovatriptan.”).) In addition, the U.K. application (and the ‘864 Patent specification) state, “It will be appreciated that compounds of formula (I) may contain one or more assymetric centres, and such compounds will exist as optical isomers (enantiomers). The invention thus includes all such enantiomers and mixtures, including racemic mixtures, thereof.” (DTX-1077 at 230; PX-0001 col.2 ll.35-39.)

The ‘864 Patent specification provides additional details. Dr. Rocco testified that a POSA would understand “3-methylamino-6-carboxamido-1,2,3,4-tetrahydrocarbazole” in claim 1 of the ‘864 Patent to describe a racemic mixture as well as the separated enantiomers. (Rocco Tr. 1728:17-1729:5.) The intermediate compound disclosed in Example 2, 3-amino-6-carboxamido-1,2,3,4-tetrahydrocarbazole (DTX-1077 at 240-41; PX-0001 9:48-10:18), is then resolved into the individual enantiomers via two methods (i.e., chiral chromatography and fractional crystallization with a chiral salt) described in Example 6 of the ‘864 Patent. (Rocco Tr. 1704:15-17.) Dr. Rocco testified that these techniques for separating enantiomers were well-known to a POSA as of the priority date, and that other separation technologies were also known in the art. (Rocco Tr.

1702:20-1703:7, 1705:22-1706:3.)[61] Even Dr. Johnson agreed that a POSA would "know the general techniques as to how to do it" (Johnson Tr. 830:10-14.)[62] See also Pfizer Inc., 882 F. Supp. 2d at 694 (finding that even in the absence of working examples, or a description of starting materials and reactions conditions, a POSA "could resolve the enantiomers based on the prior art available detailing classical resolution and chemoenzymatic synthesis without undue experimentation").

The Court finds Dr. Rocco's testimony credible. A POSA would understand the chemical compound to describe the compound as a racemic mixture or as each enantiomer. That in combination with the resolution techniques well-known to a POSA renders the

[61] See also Young Tr. 377:1-18 (explaining chiral chromatography is "the sort of technique which is available to chemists and anybody skilled in the art could perform that" as of the priority date).

[62] Although Dr. Johnson testified that resolution of the enantiomers of frovatriptan would have been "highly unpredictable" as of the priority date (Johnson Tr. 814:8-11), this conclusory statement is contradicted by other evidence in the record including his own testimony demonstrating that resolution techniques were well-known to a POSA. Dr. Johnson also acknowledged that optical rotation is a technique that permits measurement of polarized light reflected by a molecule and is a means of measuring whether you have an enantiomer. (Johnson Tr. 833:5-20.) Thus, a POSA would know "how to do it" and could determine "what they'll look like" using these well-known techniques. (See Johnson Tr. 830:18-25.) Furthermore, that the techniques and methods are known in the art favors an enablement finding even if the results of any resolution processes may have been unpredictable. See Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *46.

disclosures in the U.K. application sufficient to reasonably convey to those of skill in the art the subject matter of the claimed invention and that the inventors were in "possession of it." See Pfizer Inc., 882 F. Supp. 2d at 702 (finding adequate written description where application claimed inter alia racemic and non-racemic mixtures of compound, and expert testified chemists would understand disclosure to encompass all forms); see also Takeda Pharm. Co., 2013 U.S. Dist. LEXIS 72958, at *67 (specification need not include "every conceivable and possible future embodiment of his invention") (quoting Cordis Corp., 339 F.3d at 1365). Certainly the processes set forth in Example 6 of the '864 Patent, describing the resolution of the enantiomers of an intermediate compound which could then be converted into frovatriptan by a routine methylation satisfies the written description requirement.

For similar reasons, the Court finds that claim 1 of the '864 Patent is enabled by both the U.K. application and the '864 Patent. Claim 1 encompasses the chemical compound without reference to its stereochemistry. The U.K. application claims both racemic mixtures and enantiomers of the claimed compounds, and specifically claims an intermediate compound that could be converted to frovatriptan via routine process. The disclosures further explain various processes by which to obtain other novel compounds of formula (I). Thus, because a POSA having read the

disclosures in either the U.K. application or the '864 Patent could have prepared frovatriptan without undue experimentation, the Court finds that the claim is enabled.

However, to the extent that the application would be required to independently enable resolution of the enantiomers of the chemical compound, but see Pfizer Inc., 882 F. Supp. 2d at 688, such resolution is also enabled. This is because a POSA having read the specification could have engaged in routine experimentation using well-known resolution techniques to obtain (R)-(+) frovatriptan. The '864 Patent explains this in even greater detail as it exemplifies those methods for resolving the intermediate compound. Moreover, Dr. Johnson testified that optical rotation is a technique that permits measurement of polarized light reflected by a molecule and is a means of "measuring whether you [] have an enantiomer." (Johnson Tr. 833:5-20.) Thus, a POSA could utilize well-known resolution techniques to separate the enantiomers and would know such separation was achieved based upon well-known techniques for measuring such separation.[63] See Cephalon, Inc., 707 F.3d at 1338-39 ("[E]xtensive experimentation does not necessarily

[63] The '864 Patent provides optical rotation data for the intermediate compound. (Rocco Tr. 1705:19-21; PX-0001 col.11 ll.32-67.)

render the experiments unduly extensive where the experiments involve repetition of known or commonly used techniques.").

Mylan's expert, Dr. Johnson, opined that neither the U.K. application nor the '864 Patent describe or enable the separation of the enantiomers. (Johnson Tr. 813:22-814:11, 832:16-834:10.) In rendering his opinion, Dr. Johnson placed too much reliance on the absence of working examples describing the synthesis of frovatriptan specifically or resolution of its enantiomers and thus the Court discounts his testimony. (See Johnson Tr. 825:7-826:2); see In re Borkowski, 422 F.2d 904, 908 (C.C.P.A. 1970) ("a specification need not contain a working example if the invention is otherwise disclosed in such a manner that one skilled in the art will be able to practice it without an undue amount of experimentation"). Moreover, Dr. Johnson's written description opinion is based upon an incorrect interpretation of the law requiring the inventors to have actual physical possession of every embodiment of the claimed compound as of the priority date. (Johnson Tr. 832:16-20 ("I think she's asking me did the inventors provide evidence that they actually had in their possession the compound, the enantiomer as claimed. . . . I don't believe they did."); id. at 833:1-3 (noting absence of data demonstrating inventors "actually had [the enantiomers] in their hand and had made measurements").) However, "because written description does not require reduction

to practice, the inventors did not have to physically possess the invention or report such test results in the application." Pfizer Inc., 882 F. Supp. 2d at 704 (quoting Pfizer, Inc. v. Ranbaxy Labs., Ltd., 405 F. Supp. 2d 495, 505 (D. Del. 2005), rev'd in pan on other grounds, 457 F.3d 1284 (Fed. Cir. 2006)).

In an effort to demonstrate that enantiomeric resolution required undue experimentation, Mylan relies on internal documents produced by third-parties GlaxoSmithKline ("GSK") and Vernalis detailing Dr. Borrett's post-priority date experiments to resolve the enantiomers of frovatriptan.[64] These documents consist of lab notebooks and progress reports, as well as a Record of Invention, dating from November 1992 through September 1993. (See, e.g., DTX-1417 at GSK-FROVA00003316; DTX-1398.) Dr. Borrett screened several chiral acids, but these acids resulted in an enantiomeric excess below 10%.[65] (DTX-1418 at GSK-FROVA00015491-92.) The reports determined that the frovatriptan

[64] Endo challenged the admissibility of these documents on several grounds including authenticity and hearsay. In addition, Endo objected under Federal Rule of Evidence 703 to those portions of Dr. Johnson's opinion that rely or opine upon these materials. Because the Court finds that these documents and Dr. Johnson's corresponding testimony do not materially alter its opinion concerning enablement and written description, it assumes, without deciding, their admissibility.

[65] Enantiomeric excess, or e.e., reflects the amount of desired enantiomer over the undesired enantiomer. (See Rocco Tr. 1732:13-1733:11; Johnson Tr. 841:10-21.) An e.e. less than 10% would be deemed a poor resolution. (See Rocco Tr. 1732:13-1733:11.)

racemate could be resolved using D-pyroglutamic acid (DTX-1419 at GSK-FROVA00006793),[66] but that the purity of the acid was deemed "critical to the success of the resolution"(DTX-1421 at GSK-FROVA00006658). On September 3, 1993, Dr. Borrett completed a Record of Invention describing a resolution procedure for the frovatriptan racemate, internally designated as SB-205184, using D-pyroglutamic acid. (Johnson Tr. 837:20-838:2.) Mylan argues that the length of time it took Dr. Borrett to perfect this technique, the fact that he did not do so until years after the priority date, and the fact that some typical chiral acids did not achieve the desired separation indicate that undue experimentation was required. The Court disagrees.

These documents reflect SKB's attempts to create a more efficient and refined process for enantiomeric separation that might be suitable for commercial development of the frovatriptan product. Dr. Borrett's laboratory notebooks reflect that, prior to conducting his experiments, he received a sample of the R enantiomer of frovatriptan, internally designated as SB 209509, which purported to have an e.e.>99%.[67] (See Johnson Tr. 1032:3-9; DTX-1417 at GSK-FROVA00003330; see also id. at GSK-FROVA00003332

[66] D-pyroglutamic acid was a well-known optically-active acid that was routinely available for use in fractional crystallization. (Rocco Tr. 1733:12-1734:12.)

[67] That Dr. Borrett determined the actual e.e. to be approximately 86% is of no moment.

(received second sample).) Thus, by November 24, 1992, someone had already successfully separated the R enantiomer of frovatriptan. In describing the nature of his own invention, Dr. Borrett confirms not only that separation of enantiomers was possible prior to his experiments but also that his invention was designed to enable commercialization of frovatriptan:

> The resolution process has enabled the use of a short, 3-stage route to SB-209509. Previously, this compound could only be prepared by N-methylation of SB-205555 [the intermediate compound or precursor to frovatriptan], a low-yielding 8-stage process. The process is amenable to scale up, and will enable production of SB-209509 for foreseeable supply requests. It may also be the **method of choice** for the manufacturing route.

(DTX-1398 at GSK-FROVA00015607 (emphasis added).) Mylan failed to convincingly demonstrate that an 8-stage process as compared to a 3-stage process constitutes undue experimentation.

For similar reasons, SKB's representations to the PTO in conjunction with the Borrett Patents do not demonstrate that separation of the enantiomers required undue experimentation. Rather, those statements convey only that the enantiomer is not "specifically disclosed." Notably, when confronted with the purportedly inconsistent statements made in the Borrett Patents and related documents, Dr. Rocco's opinion that the '864 Patent discloses and enables the separation of the enantiomers did not change. He remarked, in the pharmaceutical industry, the discovery lab that invents a compound does not focus on

perfecting commercialization techniques for that compound. (Rocco Tr. 1746:2-1747:14.) Rather, the compound is frequently passed off to the process chemists who later file patents "on the perfected commercial ways" of creating a compound, which could explain why the later, more particularized, Borrett Patents were sought. (Rocco Tr. 1747:2-14; see also DTX-1398); see Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *43 ("The evidence shows that GSK's difficulties with the hydrated solvate of dutasteride pertained to its attempt to shepherd the form into the development stage.").[68]

Accordingly, the Court finds that Mylan has failed to demonstrate, by clear and convincing evidence, that the Patent is invalid for failure to describe or enable separation of the frovatriptan enantiomers.

4. Salt-hydrates

Mylan next contends that the claims are invalid because the U.K. application and the '864 Patent fail to describe and enable the creation of salt-hydrates. The Court disagrees.

[68] Mylan also points to evidence that Dr. Young, a named inventor on the '864 Patent, testified that he was not successful in separating the enantiomers of the 3-amino-6-carboxamido-1,2,3,4-tetrahydrocarbazole. (Young Tr. 381:17-382:17.) However, he also stated that he had used only one approach "which is available to chemists to resolve a compound," but it was not successful. (Id.) This testimony does not suggest significant, let alone, undue experimentation.

Judge Irenas construed "salt, solvate or hydrate thereof" in claim 1 as "one or more of a salt, hydrate, or solvate thereof" as he saw "no basis for finding that 'salt' does not also include a salt that is also a hydrate or also a [solvate]." (Claim Constr. Op. 12, 14.) The parties agreed that salt should be similarly construed in claim 6, which refers to "a physiologically acceptable salt thereof." (Id. at 11.)

Endo argues that the Court's claim construction did not encompass a discrete salt-hydrate combination and therefore the U.K. application and the '864 Patent need not explicitly describe or enable such a combination. In support, Endo relies primarily on GlaxoSmithKline LLC v. Banner Pharmacaps, Inc. 2013 U.S. Dist. LEXIS 112440, at *16. There, the court construed the term "solvate" as "a complex formed by dutasteride with a solvent in which dutasteride is reacted or from which it is precipitated or crystallized." Id. at *5. In determining that the specification need not "independently describe crystalline, precipitated, and reacted solvates as subgroups of the genus of pharmaceutically acceptable solvates," the court noted that "the drug compound is the key structural feature of the solvate." Id. at *16. Likewise, the drug compound here is the key feature and, as discussed above, frovatriptan is adequately disclosed and enabled. Furthermore, Endo is correct that "to meet the written description requirement, '[a]n applicant is not required to

describe in the specification every conceivable and possible future embodiment of his invention.'" Takeda Pharm. Co., 2013 U.S. Dist. LEXIS 72958, at *67 (quoting Cordis Corp., 339 F.3d at 1365). The salt-hydrate is merely a different form of the claimed compound. See Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *36. As such, the patent need not independently describe or enable a discrete salt-hydrate combination.

Dr. Rocco, whom this Court found credible, opined that the '864 Patent discloses and teaches a POSA "to make salts and salt hydrates, or any combination of both." (See Rocco Tr. 1741:13-20, 1742:19-1743:3.) Dr. Rocco testified that a salt could be hydrous or anhydrous, and a person would not know if it was one or the other unless it was specified. (Rocco Tr. 101:8-12; see also King Tr. 190:8-23 (stating that it cannot be determined from the information provided in Example 24 whether it contains water); Young Tr. 381:3-5 (noting Example 24 does not identify if it is a salt hydrate).) The '864 Patent discloses that "solvates and hydrates of compounds of formula (I)" are also included within the scope of the invention. (PX-0001 col.3 ll.6-8.)[69] Moreover, Example 5 of the '864 Patent discloses the

[69] See also DTX-1077 at 236 ("The present invention therefore provides in a further aspect pharmaceutical compositions comprising a compound of formula (I) or a physiologically acceptable salt or solvate thereof and a physiologically acceptable carrier.").

preparation of a monohydrate form of 3-amino-6-carboxamido-1,2,3,4-tetrahydrocarbazole. (PX-0001 col.11 ll.4-28; see also Johnson Tr. 852:12-15.)

The U.K. application and the '864 Patent also indicate that the disclosed compounds may include physiologically acceptable salts, and specifies that those salts may be formed with succinic acid:

> Suitable physiologically acceptable salts will be apparent to those skilled in the art and include for example acid addition salts such as those formed with inorganic acids e.g. hydrochloric, sulphuric or phosphoric acids and organic acids e.g. oxalic, succinic, maleic, acetic or fumaric acid.

(DTX-1077 at 231; see also PX-0001 2:66-3:3; Rocco Tr. 1707:23-1708:18.) Both provide numerous examples of salts formed using some of these listed acids. (See, e.g., PX-0001 at Exs. 1 (hydrochloride salt), 7 (oxalate salt), 9 (hemioxalate salt); DTX-1077 at 239-40.) Indeed, Example 24 of the '864 Patent details the synthesis of the frovatriptan compound as the hydrochloric salt, though the specification does not identify whether it yields a salt-hydrate form. (See King Tr. 190:8-23; Young Tr. 374:7-8, 381:3-8.)

Because a salt may be either hydrous or anhydrous and absent certain identifying information a POSA cannot definitively rule out the presence of water in a salt, it is difficult for this Court to understand why a POSA would not

believe that the inventors were in possession of a salt-hydrate based upon the disclosures contained in either the U.K. application or the '864 Patent. This is especially true with respect to the '864 Patent specification, which exemplifies the creation of both a salt and a hydrate form of the covered compounds. See Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *16 ("There is no reason why a person skilled in the art would not credit a patentee with possession of a solvate merely because the patentee did not disclose solvates formed by each solvation process.").

As Mylan's expert, Dr. Lee, acknowledged, the methods of salt creation were known to a POSA as of the priority date. If a scientist wanted to make a salt, she would first dissolve the free base in a solvent and then add an acid. (Lee Tr. 493:6-12.)[70] Example 24 details the synthesis of frovatriptan as the hydrochloride salt, which Dr. Lee agreed hypothetically could be converted into the frovatriptan free base and reacted with a different acid to form a different salt. (Lee Tr. 492:8-493:4.) He further testified that following this process using succinic

[70] Dr. Johnson and Dr. Lee conclusorily asserted that salt and salt-hydrate formation as of the priority date were unpredictable, but the Court does not credit this testimony in light of the other contradictory evidence. Even if the characteristics of the resultant salt were unknown, the testimony makes clear that the process of obtaining a salt was routine and well-known to a POSA. See Banner Pharmacaps, Inc., 2013 U.S. Dist. LEXIS 112440, at *46.

acid, which is listed in the patent specification and U.K. application among the acids that could be used, could produce a succinic salt. (Lee Tr. 492:8-493:4.)[71] Moreover, Mylan's own documents demonstrate that the frovatriptan free base combined with succinic acid in a solvent forms frovatriptan succinate monohydrate, a salt-hydrate. (Lee Tr. 496:18-22; PX-0059 at MYL-FRO0045949.)[72]

Mylan attempts to rebut this evidence through the testimony of Dr. Lee, whose colleague, Dr. Michael Rodgers, attempted to replicate a fraction of the experiment set forth in Example 24. (See Lee Tr. 428:3, 428:8-17, 400:5-13.) The experiment yielded a salt but not a salt-hydrate, which Mylan contends demonstrates that the patent fails to enable creation of a salt-hydrate. However, cross-examination of Dr. Lee raised several

[71] Mylan cites Dr. Lee's testimony that a POSA replacing hydrochloric acid in Example 24 with succinic acid would have no expectation of successfully obtaining a succinic salt because of a BOC protecting group that prevents a substituent from reacting with other chemicals. (Lee Tr. 415:20-419:18.) However, Dr. Lee later testified that absent this BOC group, succinic acid could be reacted with the free base to form a succinic salt. (Lee Tr. 492:4-14.)

[72] The Court recognizes that PX-0059 is a post-priority date document that is irrelevant to the state of the art as of the priority date and the Court does not rely upon it for that purpose. However, this document does not contradict either Dr. Rocco's testimony regarding a POSA's understanding of the '864 Patent or Dr. Lee's testimony that such a process could form a succinic salt. Cf. Plant Genetic Sys., N.V. v. DeKalb Genetics Corp., 315 F.3d 1335, 1344 (Fed. Cir. 2003).

deficiencies in the experimental process, including the use of certain intermediate compounds that may not have exhibited the same purity level or other identifying characteristics as the original compounds created in Example 24. (Lee Tr. 428:8-17, 429:12-22.) In addition, Mr. Rodgers completed two runs and each time he obtained a different quantity of the compound, which each had a different melting point. Significantly, neither of these iterations resulted in a compound with a quantity or melting point identical to that set forth in the patent.[73] As Endo notes, Dr. Lee did not provide a satisfactory explanation as to these experimental differences but explained some of them could be the result of "simple experimental error." (Lee Tr. 482:16-18.) These and other inconsistencies called into question the accuracy of Mr. Rodgers' results, as well as the validity of the conclusions drawn therefrom. (See, e.g., Lee Tr. 468:13-15; compare DTX-1202 with PX-0001 col.16 ll.42-67; Rocco Tr. 1713:15-17 ("same compounds of the same purity should have the same melting point").)

In any event, whether Example 24 yields only a salt does not undermine Dr. Rocco's testimony that the patent enables a

[73] Example 24 yielded 80 mg of the compound with a melting point of 327-328°. The first run of Mr. Rodgers' experiment yielded 64.5 mg with a melting point of 296-297°, while the second run yielded 45.9 mg with a melting point of 291-293°. (PX-0001 col.16 ll.60-63; DTX-1202 at 3, 4-6; Lee Tr. 482:2-13, 489:19-25, 491:14-23.)

POSA to create salts, salt-hydrates, or any combination thereof. Mylan's entire argument regarding the lack of disclosure and enablement of a salt-hydrate boils down to the fact that neither the U.K. application nor the '864 Patent specification contain an example explicitly identifying the formation of a salt-hydrate of frovatriptan. (Cf. Johnson Tr. 851:24-853:2 (explaining basis of his opinion is that none of the examples reflect a salt-hydrate).) However, it is well-established that neither the written description nor enablement requirement mandates inclusion of examples or an actual reduction to practice. See In re Borkowski, 422 F.2d 904, 908 (C.C.P.A. 1970) ("a specification need not contain a working example if the invention is otherwise disclosed in such a manner that one skilled in the art will be able to practice it without an undue amount of experimentation"); Takeda Pharm. Co., Ltd. V. TWi Pharms., Inc., 2013 U.S. Dist. LEXIS 72958, at *66-67 (citing Falko—Gunter Falkner, 448 F.3d at 1366-67). Thus, while the Court may look to any examples in the specification, see Boston Sci. Corp. v. Johnson & Johnson, 647 F.3d 1353, 1364 (Fed. Cir. 2011), the absence of such examples alone does not necessitate a finding that the patent is invalid due to an insufficient written description or lack of enablement.

To the extent Mylan relies upon the statements made during the prosecution of the Borrett Patents, these documents are of

limited relevance as they acknowledge only that the '864 Patent does not specifically teach the particular (R)-(+) frovatriptan enantiomer salt-hydrate. (See DTX-1427 at MYL-FRO0047563.) But that opinion—offered by an individual whose credibility the Court did not have an opportunity to consider—does not address whether practicing the invention of the '864 Patent would require undue experimentation, which is the standard applicable here.

The cases on which Mylan relies are unavailing, as the courts there found the asserted claims were not enabled based on the underdeveloped state of the art at the time. See, e.g., Monsanto Co. v. Syngenta Seeds, Inc., 503 F.3d 1352, 1361-62 (Fed. Cir. 2007) (claims invalid for failure to enable transformation of monocot cells, which was not possible under the state of the art as of the filing date); Alza Corp. v. Andrx Pharms., 603 F.3d 935, 941 (Fed. Cir. 2010) (finding claims were not enabled because relevant field "was not mature" and the claimed dosage was considered a "'breakaway' from the prior art"). On the contrary, here, there is evidence that salt formation methods were known to a POSA and Mylan did not persuade the Court that the creation of a salt-hydrate, as opposed to the anhydrous salt, would require undue experimentation as of the priority date.

The Court thus concludes that Mylan has failed to meet its burden of demonstrating a lack of sufficient written description or enablement of a salt-hydrate.

5. Treatment

Mylan also argues that claims 2 and 3 of the '864 Patent are not sufficiently described or enabled because the U.K. application and the '864 Patent are silent as to the treatment of migraine that is "expected to present." Mylan relies exclusively on the testimony of Dr. Peroutka, who provided opinions on these issues only "to the extent the court construes" the asserted claims "to encompass the prophylactic treatment of migraine." (See Tr. 578:8-16 (quoting DTX-1219 ¶¶ 13-14 (Expert Report of Dr. Peroutka)).) Because Judge Irenas subsequently construed "treatment" as "treatment without prophylaxis" (Claim Constr. Op. 20), Endo argues that Dr. Peroutka has not provided a relevant opinion under the current claim construction.

In response, Mylan contends that by interpreting "treatment" to include relief from a condition that is "expected to present," the Court carved out a portion of what is medically considered to be, in essence, prophylactic treatment and attributed it to "treatment". (See Tr. 581:1-10; Peroutka Tr.

591:9-592:16.)[74] Critical to Mylan's argument is its view that "expected to present" encompasses the anticipation of migraine in the absence of either symptoms or headache pain. (Peroutka Tr. 592:12-14 ("So this construction would clearly cover, I mean it says it right there, taking it this [sic] in anticipation, meaning when there is [sic] no symptoms.").) But this view ignores the context in which Judge Irenas referred to migraine that is "expected to present" and therefore completely distorts the Court's claim construction.

Mylan initially sought a construction of "treatment" that included prophylactic treatment, which Dr. Peroutka defined as "'routinely administering the claimed compounds regardless of the presence of headache pain.'" (Claim Constr. Op. 15, 17 (quoting Peroutka Report ¶ 36).) The Court rejected this construction, noting that a POSA would understand prophylaxis to be distinct from treatment. (Id.) In explaining this determination, the Court cited Dr. Rocco who defined treatment as the "administration of a compound for the purpose of providing relief from a condition at the time at which that condition has presented or is **expected to present**." (Id. (citing Rocco Report ¶¶ 69-70) (emphasis added).) Judge Irenas disagreed

[74] Dr. Peroutka explained that "the way the judge split it up, he kind of took what I would call as a physician prophylaxis and he put it into the, quote, treatment group, not really separating acute from prophylaxis." (Tr. 592:9-14.)

with Mylan's assertion that this language referred to prophylaxis. (Id.)

Significantly, the Court went on to say that

> [f]or example, as both parties have noted, migraines are often preceded by any number of symptoms, such as an aura or nausea. Thus, **when a migraine sufferer experiences such a symptom, she can expect that a migraine will occur** and thus take medication to treat the oncoming migraine. Or in the case of menstrual migraines, the patient could take the medication around the time each month that she would expect the migraines to present.

(Id. (emphasis added).) When read in the context of this discussion, which Mylan sidesteps, a migraine is "expected to present" when a migraine sufferer experiences any symptoms that are understood to typically accompany migraine. The same analysis applies to menstrual migraines, but the symptoms experienced coincide with the time of a woman's menses. Regardless of the type of migraine (menstrual migraine or classic migraine), a migraine sufferer knows that a migraine is imminent at the point when her symptoms first appear, and she may treat it through administration of a drug. In other words, the Court drew the line separating "treatment" and "prophylaxis" at the point when migraine symptoms begin to manifest.

As the Court implied, it would be irrational to construe providing relief in the face of symptoms (but prior to actual headache pain) as "prophylaxis" rather than as "treatment". According to Dr. Peroutka, migraine is a syndrome and proceeds

in stages: “a migraine is not just that middle section of headache, it’s the 12 hours leading up and a post phase of about 23.” (Peroutka Tr. 535:7-536:1.) The period of time preceding the headache phase is referred to as the “prodromal phase,” which may last up to twelve hours. (Peroutka Tr. 535:7-536:1.) During this phase people may experience a variety of symptoms such as fatigue, mood changes, and aura. (Id.; see also Johnson Tr. 659:7-660:2 (explaining that “classic migraine” sufferers experience aura, scintillating scotoma or jagged flashing lights, as well as autonomic disturbances such as nausea).) The prodromal phase is succeeded by the headache phase characterized by severe head pain, and then a recovery phase. A migraine sufferer experiencing light sensitivity or an aura would not wait to treat the oncoming headache until she was in the midst of the headache phase and already suffering severe pain. Hence, the Court’s construction of treatment as including treatment of a migraine that is expected to present, i.e. where a migraine sufferer is experiencing migraine symptoms but may not be suffering head pain, recognizes the existence of this prodromal phase of a migraine.

Because Mylan’s argument is founded upon a faulty and interpretation of the Court’s claim construction, Mylan has failed to present clear and convincing evidence that claims 2 and 3 lack a sufficient written description and are not enabled.

Dr. Peroutka testified that there are certain "very well-known triggers" that may induce a migraine in a particular individual. (Peroutka Tr. 595:6-597:15.)[75] Stress, diet, wine consumption, altitude or weather changes, and lack of sleep are among these triggers. (Id.) Once an individual has identified her particular trigger, she may be able to anticipate when she will suffer a migraine. (Peroutka Tr. 597:4-6; Grosberg Tr. 1375:1-7.) However, the '864 Patent contains no information regarding these triggers or when, how much, how often, and how to administer the compound for the "anticipatory" treatment of migraines. (Peroutka Tr. 597:12-22; see also Peroutka Tr. 610:23-611:9 (patent does not contain dosing information or frequency of dosing).) As Mylan explains, "For example, if a patient gets migraine regularly when the weather changes, and the weatherman predicts a 70% chance of rain, does that mean that the migraineur expects a migraine to present? And if so, when and in what amounts of drug should the migraineur take?" (Mylan's Resp. to Endo's Opening Post-Trial Br., Dkt. Ent. 207, at 18.) However, this exemplifies the fundamental problem with Mylan's argument—Dr. Peroutka's testimony improperly injects a truly

[75] Dr. Grosberg, Endo's expert, similarly testified that "a number of patients will notice that their migraine attacks can be particularly triggered by identifiable exposures, whether it's stress, certain types of food, the changes in weather" and consequently their attacks may be "predictably triggered." (Grosberg Tr. 1375:1-7.)

prophylactic element into "treatment," contrary to the Court's claim construction, and then uses that definition as the foundation for his flawed opinion. The definition of treatment relied upon is thus outside the scope of this Court's claim construction and cannot serve as the basis for declaring the patent invalid.

Contrary to Mylan's argument, both the '864 Patent and the U.K. application describe a week-long treatment regimen that includes dosing information. In particular, the '864 Patent provides:

> The physiologically acceptable compounds of the invention will normally be administered in a daily dosage regimen (for an adult patient) of, for example, an oral dose of between 1 mg and 500 mg, preferably between 10 mg and 400 mg, e.g. between 10 and 250 mg or an intravenous, subcutaneous, or intramuscular dose of between 0.1 mg and 100 mg, preferably between 0.1 mg and 50 mg, e.g. between 1 and 25 mg of the compound of the formula (I) or a physiologically acceptable salt thereof calculated as the free base, the compound being administered 1 to 4 times per day. Suitably the compounds will be administered for a period of continuous therapy, for example for a week or more.

(PX-001 col.7 ll.56-67; see also DTX-1077 at 237.) This disclosure clearly identifies a dosage amount, how many times a day to administer that dosage amount, and for how long the treatment may be continued. It thus provides a sufficient written description. Moreover, Mylan did not submit evidence to suggest that the disclosed treatment regimen fails to enable the effective treatment of migraine, as this Court has construed it.

Indeed, Dr. Peroutka testified that "taking any triptan, including frovatriptan, regularly during a period of days when a migraine attack is likely . . . one would expect that [] a reduction in overall moderate and severe headaches might occur over a period of several days." (Peroutka Tr. 626:4-628:10.) As such, Mylan has failed to overcome the presumption of validity. See Sciele Pharma Inc., 684 F.3d at 1260.

III. Exceptional Case Under 35 U.S.C. § 285

Endo seeks costs and attorneys' fees under 35 U.S.C. § 285 "on the basis of Mylan's litigation misconduct and unprofessional behavior." (Pl.'s Br. at 35.) This request is denied. The Court sees no basis whatsoever for holding that Mylan engaged in misconduct warranting an exceptional case finding under § 285. Quite the contrary. Indeed, both parties litigated this case vigorously, effectively, and in good faith. The Court commends counsel.

CONCLUSION

For the foregoing reasons, the Court finds that Mylan has failed to demonstrate by clear and convincing evidence that the '864 Patent is invalid as anticipated, obvious, or due to an insufficient written description or lack of enablement. Accordingly, the Court enters judgment in favor of Endo and against Mylan. An appropriate Order will issue herewith.

Date: January 28, 2014

s/Renée Marie Bumb
RENÉE MARIE BUMB
UNITED STATES DISTRICT JUDGE