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Patenting Pharmaceutical Drug Formulations: Withstanding Litigation and PTAB Challenges

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Pharmaceutical Formulation Claims: Recent Court Treatment

Endo Pharmaceuticals Solutions, Inc. v. Custopharm Inc., 894 F.3d 1374 (Fed. Cir. 2018)

- Endo holds the approved New Drug Application for Aveed®, a testosterone undecanoate (TU) intramuscular injection.

- Bayer owns the two patents listed in the Orange Book for Aveed®, U.S. Patent Nos. 7,718,640 (the '640 patent) and 8,338,395 (the '395 patent).

The Federal Circuit affirmed the district court's ruling that the asserted patent claims were not obvious.

Endo Formulation Claims

- Claim 2 of the '640 patent: A composition formulated for intramuscular injection in a form for single injection according to claim 1, which contains 750 mg testosterone undecanoate.

- Claim 1. A composition formulated for intramuscular injection in a form for single injection which contains 250 mg/ml testosterone undecanoate in a vehicle containing a mixture of castor oil and benzyl benzoate wherein the vehicle contains castor oil in a concentration of 40 to 42 vol %.

Endo (con't)

- Custopharm: the references inherently disclosed the formulation, because they recited the TU injection's pharmacokinetic performance, from which a skilled artisan could derive that the vehicle contained 40% castor oil and 60% benzyl benzoate.

- FC: No, the pharmacokinetic profiles in the clinical references did not necessarily point to the use of the claimed vehicle or bar the possibility of alternatives.

  - Custopharm had not shown that a POSITA could extrapolate the vehicle formulation used in the clinical study references from the pharmacokinetic performance data.

  - The prior art disclosed many potential co-solvents such that skilled artisans reviewing the clinical studies would not have necessarily recognized that the references' authors used benzyl benzoate as a co-solvent for their reported clinical studies.
    - Credited Endo's expert's testimony that, based on the references' disclosures, a POSITA would not have recognized that a co-solvent was necessary, and even if one was necessary, many were available.
    - Custopharm's expert conceded that even knowing the co-solvent's identity would not necessarily lead a skilled artisan to the ratio claimed in the asserted patents.

Endo (con't)

- Custompharm: A POSITA would have turned to Proluton when formulating a long-acting, injectable testosterone therapy.
  - Proluton is a commercially available injectable composition of hydroxyprogesterone in a mixture of 40% castor oil and 60% benzyl benzoate administered weekly to pregnant women to prevent miscarriage.

- FC rejected argument.
  - Unlike Aveed®, Proluton is not a testosterone product for men.
  - Proluton is not an injectable steroid with prolonged activity. Consequently, the Federal Circuit was not persuaded that a skilled artisan would have turned to Proluton when formulating a long-acting, injectable testosterone therapy.

Side note re related MOT claims, which were also upheld by the Federal Circuit: Endo presented evidence that injections like TU injections behave in unpredictable ways and that dose and regimen changes would require more than routine experimentation. Specifically, the clinical study references did not disclose a linear relationship between dose amount and amount of TU in the patient's body.

HZNP Meds. LLC v. Actavis Labs., 940 F.3d 680 (Fed. Cir. 2019)

- Claim 49. A topical formulation consisting essentially of: 1-2% w/w diclofenac sodium; 40-50% w/w DMSO; 23-29% w/w ethanol; 10-12% w/w propylene glycol; hydroxypropyl cellulose; and water to make 100% w/w, wherein the topical formulation has a viscosity of 500-5000 centipoise.

- DC: "consisting essentially of" indefinite.

  - Found 5 "basic and novel properties" in specification: (1) better drying time; (2) higher viscosity; (3) increased transdermal flux; (4) greater pharmacokinetic absorption; and (5) favorable stability.

  - "better drying time" indefinite.
    - Specification described two different methods for evaluating "better drying time" which gave different results.
    - "a POSITA would not know under which standard to evaluate the drying rate of the claimed invention."
    - A POSITA would not have "reasonable certainty" about the scope of the basic and novel properties of the invention.
    - On rehearing, found "favorable stability" indefinite too.

Not Obvious

- *HZNP* (con't)
  - Actavis argued that modifying PENNSAID® 1.5% to get the PENNSAID® 2% formulation would have been obvious to a POSITA because "the drawbacks to PENNSAID® 1.5%—frequent application and vulnerability to run-off—were known, and that "all the changes were obvious optimizations of result-effective variables that produced a predictable result in relation to absorption, thickness, and drying times."
  - Horizon argued the prior art reflected that the field of topical pharmaceutical formulations is complex and unpredictable.
  - DC: Not invalid for obviousness.
    - "not a result of routine optimization of PENNSAID® 1.5% . . . because general principles and ranges of permissible concentrations would not have predicted the exact formulation and dosing frequency that resulted in PENNSAID® 2%."
    - "the variables involved in this case, including the components of the inventive formulation, interact in an unpredictable or unexpected way, such that the results emanating into PENNSAID® 2% were not obvious.
    - Nothing in the prior art allowed a POSITA to find "the schematic or roadmap to a diclofenac gel effective at two doses a day."
    - "the combination of adjustments needed to change PENNSAID® 1.5% into PENNSAID® 2% was not predictable from the prior art."

Federal Circuit: Affirmed Indefinite

- *HZNP* (con't)
  - Affirmed indefiniteness holding.
    - "Having used the phrase 'consisting essentially of,' and thereby incorporated unlisted ingredients or steps that do not materially affect the basic and novel properties of the invention, a drafter cannot later escape the definiteness requirement by arguing that the basic and novel properties of the invention are in the specification, not the claims. Indeed, this contravenes the legal meaning associated with the phrase 'consisting essentially of.'"
    - "To determine if an unlisted ingredient materially alters the basic and novel properties of an invention, the *Nautilus* definiteness standard requires that the basic and novel properties be known and definite. Accordingly, in this case, the district court did not err in considering the definiteness of the basic and novel properties during claim construction."
    - The district court did not err in determining that the basic and novel property of 'better drying time' was indefinite.
      - the two different methods disclosed in the specification for evaluating 'better drying time' do not provide consistent results at consistent times.

Federal Circuit: Affirmed Nonobvious

- *HZNP* (con't)
  - Actavis: "the district court erred by requiring that the prior art predict the exact formulation of the asserted claim."
  - FC: Affirmed nonobvious holding.
    - "While a drug formulator could be inspired by general knowledge and the prior art to adjust a certain variable, the district court found that the variables here interacted with each other in unpredictable ways."
    - "the inventive formulation was complex and that a POSITA would be challenged to predict relative ratios in order to achieve the desired goal of PENNSAID® 2%."

Reasonable Expectation Of Success In Unpredictable Arts

- *OSI Pharms., LLC v. Apotex Inc.*, 939 F.3d 1375 (Fed. Cir. 2019) (STOLL, Newman, Taranto)
  - N-(3-ethynylphenyl)-6,7-bis(2-methoxyethoxy)-4-quinazo-linamine, also known as erlotinib.
    - OSI markets as Tarceva®.
  - IPR2016-01284 FWD claims 44-46 and 53 of U.S. 6,900,221 unpatentable.
  - FC: Reversed.
    - Finding of reasonable expectation of success not supported by substantial evidence.

Background

- Non-small cell lung cancer (NSCLC).
- Most therapies for NSCLC failed in clinical trials, even ones that seemed promising *in vitro*.
  - 1631 new drugs studied in phase II.
  - 7 gained FDA approval (.04%).
- "Cancer treatment is highly unpredictable."

OSI Claim

- 44. A method for the treatment of NSCLC (non small cell lung cancer), pediatric malignancies, cervical and other tumors caused or promoted by human papilloma virus (H[P]V), Barrett's esophagus (pre-malignant syndrome), or neoplastic cutaneous diseases in a mammal comprising administering to said mammal a therapeutically effective amount of a pharmaceutical composition comprised of at least one of N-(3-ethynylphenyl)-6,7-bis(2-methoxyeth-oxy)-4-quinazolinamine, or pharmaceutically acceptable salts thereof in anhydrous or hydrate forms, and a carrier.

References

- Schnur: discloses 105 compounds, including erlotinib and method of making, and discloses lung cancer as condition that could be treated.

- Gibbs: discusses studies including one on erlotinib; "appear to have good anti-cancer activity in preclinical models, with an acceptable therapeutic index, particularly in patients with non-small cell lung cancer."
  - No data regarding the use of erlotinib to treat NSCLC in Gibbs or in any of the references cited in Gibbs.
  - Patent Owner submitted reference by Gibbs (spoiler for Case Studies!)

- OSI's 10-K: "[Erlotinib] is a potent, selective and orally active inhibitor of the epidermal growth factor receptor, a key oncogene in these cancers.
  - No data on erlotinib on NSCLC.

PTAB Decision

- A POSITA "would have combined Gibbs or OSI 10-K with Schnur and had a reasonable expectation of success of achieving the invention of challenged claims 44 and 53."
- Schnur discloses all of the limitations of claims 44 and 53 except for the treatment of NSCLC.
- OSI's 10-K would have provided a person of ordinary skill with a reasonable expectation of success in light of Schnur's teachings.
- Credited Gibb's "good anti-cancer" activity comment even though unsupported with data.
- Discounted Gibb's testimony.

Federal Circuit Decision

- PTAB's conclusion "not supported by substantial evidence."
  - "Board misinterpreted the asserted references to teach more than substantial evidence supports."
  - "the claims require only treatment of a mammal with erlotinib—efficacy in humans is not required. But the asserted references do not disclose any data or other information about erlotinib's efficacy in treating NSCLC. The record does not contain any clinical (human) data or pre-clinical (animal) data. It does not even include in vitro (test tube) data regarding erlotinib's effect on NSCLC."
  - "At the same time, it is undisputed that NSCLC treatment was highly unpredictable with an over 99.5% rate of failure for drugs entering Phase II clinical studies."

Federal Circuit (con't)

- Gibb's "anti-cancer" comment only supported by references 12, which does not mention erlotinib, and 13, which does not mention NSCLC.
- "no evidence that a publication discussing erlotinib's effect on NSCLC existed at the time Gibbs was published."
- "asserted references do not disclose any information about erlotinib's efficacy in treating NSCLC in a mammal."

Federal Circuit (con't)

- "The lack of erlotinib-NSCLC efficacy data or other indication of success here is significant because of the highly unpredictable nature of treating NSCLC, which is illustrated by the over 99.5% failure rate of drugs entering Phase II. ... Indeed, this failure rate includes only drug candidates that were promising enough to make it to Phase II trials, and does not even take into account all of the drug candidates that failed in the preclinical stage and in Phase I studies. Further, it is undisputed that a drug's success in treating one type of cancer does not necessarily translate to success in treating a different type of cancer, which underscores the unpredictability in cancer treatment generally."

- "there is not only a complete absence of data regarding the effect of erlotinib on NSCLC, but also a complete absence of an indicator or mechanism on which a person of ordinary skill could rely to reasonably expect success. "

Federal Circuit (con't)

- "There is nothing in OSI's 10-K suggesting the existence of erlotinib preclinical efficacy data that is specific to NSCLC. Even if a skilled artisan could presume that some preclinical data exists, there is no basis for assuming that the data pertains to NSCLC as opposed to other cancers. And just because the EGFR is targeted by a drug does not necessarily mean that the drug will treat NSCLC. …(Dr. Bunn testifying that several EGFR inhibitors that showed promising *in vitro* activity failed later in the drug development process)."

Federal Circuit (con't)

- "Moreover, between 1990 and 2005, a period that includes the time of the invention, there were 1,630 other new drug compounds that, like erlotinib, targeted NSCLC and were studied in Phase II trials. The failure rate for these compounds was 99.5%. The Board did not properly consider OSI's 10-K statement in light of the 99.5% failure rate of the other 1,630 drugs entering Phase II trials for the treatment of NSCLC. Given this high failure rate, a fact finder could not reasonably find that the 10-K statement combined with Schnur would have been sufficient to create a reasonable expectation of success. These references provide no more than hope—and hope that a potentially promising drug will treat a particular cancer is not enough to create a reasonable expectation of success in a highly un-predictable art such as this. Indeed, given a 99.5% failure rate and no efficacy data or any other reliable indicator of success, the only reasonable expectation at the time of the invention was failure, not success. It is only with the benefit of hindsight that a person of skill in the art would have had a reasonable expectation of success in view of the asserted references."

Take-Aways

- Martial evidence to show how unpredictable the chemistry is, even of drugs having received IND approval and even advancing through Phase II.

- May also be able to show that Phase III results are separately patentable over Phase II results.

- Caution on claim scope: OSI may work best for single species and single method of treatment on the theory that unpredictability can limit the scope of enablement.

Sanofi-Aventis Deutschland GmbH v. Mylan Pharms., Inc., No. 2019-1368, -1369 (Fed. Cir. Nov. 19, 2019) (non-precedential)

- Claim 7. A pharmaceutical formulation comprising Gly(A21), Arg(B31), Arg(B32)-human insulin,
  - at least one chemical entity chosen from polysorbate and poloxamers;
  - at least one preservative; and water,
  - wherein the pharmaceutical formulation has a pH in the acidic range from 1 to 6.8.

- Mylan: unpatentable for obviousness based on combining either the Lantus® Label or an article by Owens with one or more of three secondary references.

- PTAB: FWD claims unpatentable as obvious.
  - A POSITA would have been motivated to make the required combination based on a recognition that insulins had an aggregation problem in vials with air space and that surfactants (like the standard ones claimed here) offered a solution.

Sanofi Arguments

- PTAB required, under *KSR*, to find in the prior art a recognition of an aggregation problem for glargine specifically (not just insulins in general);
- PTAB improperly relied on each patent's own (shared) specification in finding a motivation to combine; and
- Evidence cited by the Board concerned insulins in general rather than glargine specifically.
  - Insufficient for motivation to combine or reasonable expectation of success.
- Did not sufficiently credit evidence of commercial success.

Federal Circuit Majority

- (TARANTO, Chen): Affirmed.
  - "Nothing in KSR demands the kind of prior-art identifications of a problem at the level of specificity that Sanofi urges. The Board thus properly examined the evidence in this particular case to determine whether a relevant artisan would have recognized an insulin aggregation problem in the prior art and expected glargine to share that problem."
  - Specification used to show state of prior art (that insulin known to aggregate on hydrophobic surfaces, at the air/water interface of a container, and in acidic solutions), which is acceptable. Also, supported by other references.
  - Motivation to combine and reasonable expectation of success holdings supported.
    - A POSITA "would have understood glargine to come within the general recognition of an aggregation problem for insulins."
    - "prior art taught use of nonionic surfactants like those claimed in the present patents to address the aggregation problem."

"Background of the Invention" Section of Specification

- "The specific preparation of insulin glargine, which leads to the prolonged duration of action, is characterized, in contrast to previously described preparations, by a clear solution having an acidic pH. Especially at acidic pH, insulins, however, show a decreased stability and an increased prone-ness to aggregation on thermal and physicomechanical stress, which can make itself felt in the form of turbidity and precipitation (particle formation (Brange et al., J. Ph. Sci 86:517-525 (1997))."
- "The proneness to aggregation can additionally be promoted by hydrophobic surfaces which are in contact with the solution (Sluzky et al., Proc. Natl. Acad. Sci. 88:9377-9381 (1991). Surfaces which can be considered as hydrophobic are the glass vessels of the preparations, the stopper material of the sealing caps or the boundary surface of the solution with the air supernatant. In addition, very fine silicone oil droplets can function as additional hydrophobic aggregation nuclei in the taking of the daily insulin dose by means of customary, siliconized insulin syringes and accelerate the process."

Affirmed Commercial Success Evidence "Weak"

- Lantus® was commercially successful, "but that success began with the original glargine formulation, which lacked the surfactant claimed in the [patents at issue]."

- Rejected Sanofi's argument that had it not reformulated Lantus® to include a nonionic surfactant, it "'could have' suffered potential regulatory action and a loss of sales" as hypothetical conjecture.

- "Sanofi owned two so-called 'blocking patents' giving Sanofi exclusive rights to the glargine compound itself … which gave Sanofi control over another's commercial domestic entry into the market with the improvement claimed in the '652 and '930 patents. … Sanofi's blocking patents made Sanofi's commercial success with the modified Lantus® product—following its commercial success with the original Lantus® product—'weak' as evidence[.]"

Federal Circuit Dissent

- (Newman)
  - "[N]either the problem nor its remedy is shown in the prior art."
  - "The court today enlarges the criteria of invalidity, to include hindsight analysis of foreseeability of the problem and its solution, citing information in the inventor's patent specification as prior art against the invention."
  - "The majority ignores the known uncertainties of insulin formulation instability. Instead, the PTAB and now the panel majority look for and find the various components of Sanofi's new composition in the scientific literature, and rule that this stabilized new glargine formulation could obviously be made and would obviously be successful in preserving extended-release properties and full insulin activity without adverse physiologic response, while avoiding the observed deterioration in ampoules."

Federal Circuit Dissent

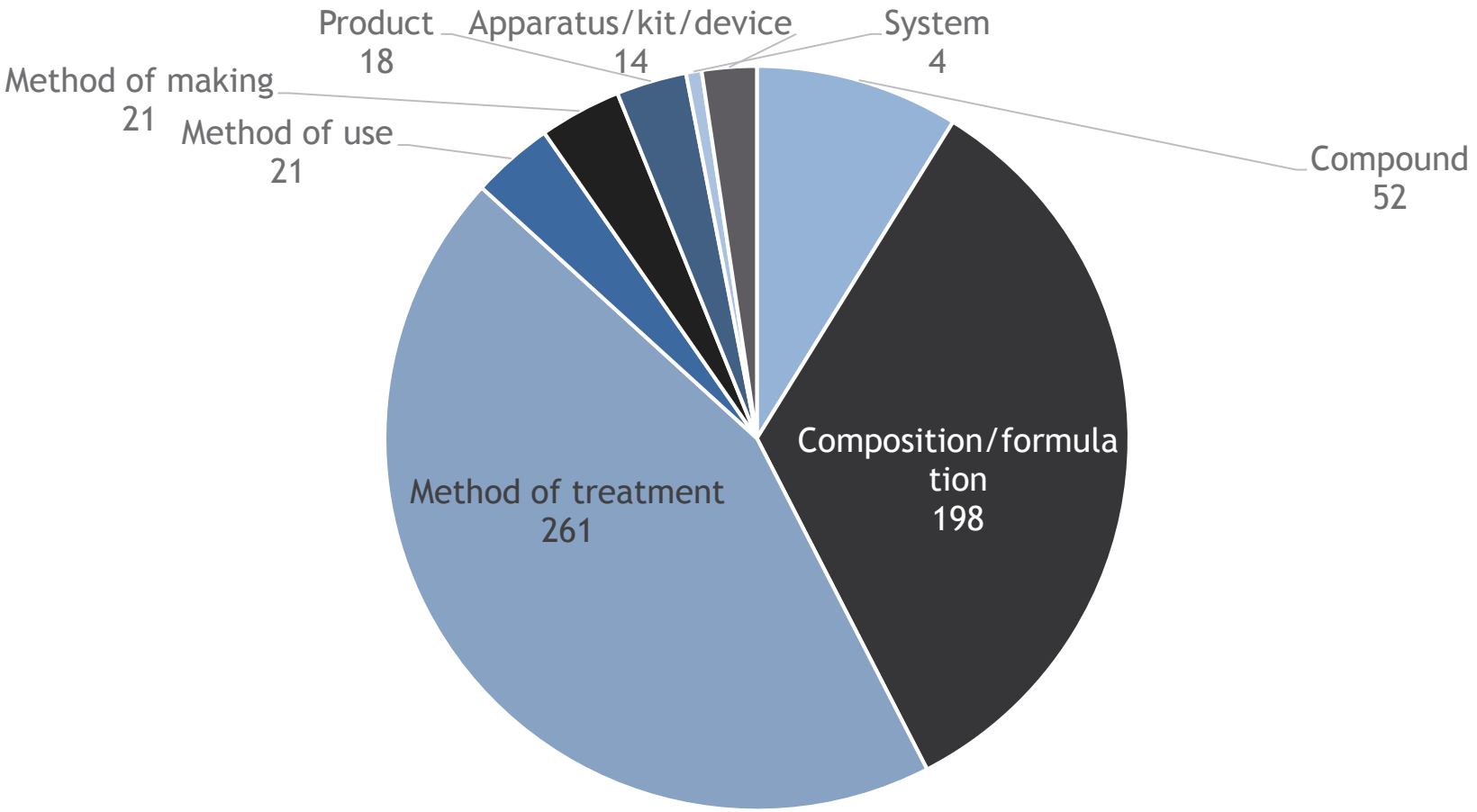
- (Newman)
  - "Mylan offered no evidence of development of competitive formulations, although the Hatch-Waxman Act insulates such development from infringement. My colleagues err in viewing this [blocking patent] theory as negating nonobviousness, for by statute medicinal product development cannot be blocked."
  - Patent specification is not prior art.

Take-Aways

- Avoid discussing prior art in the patent specification.
- Consider how “problem” is characterized.
- Do not skimp on arguments relating to objective evidence of nonobviousness.
- Be prepared for “blocking patent” argument to be raised.

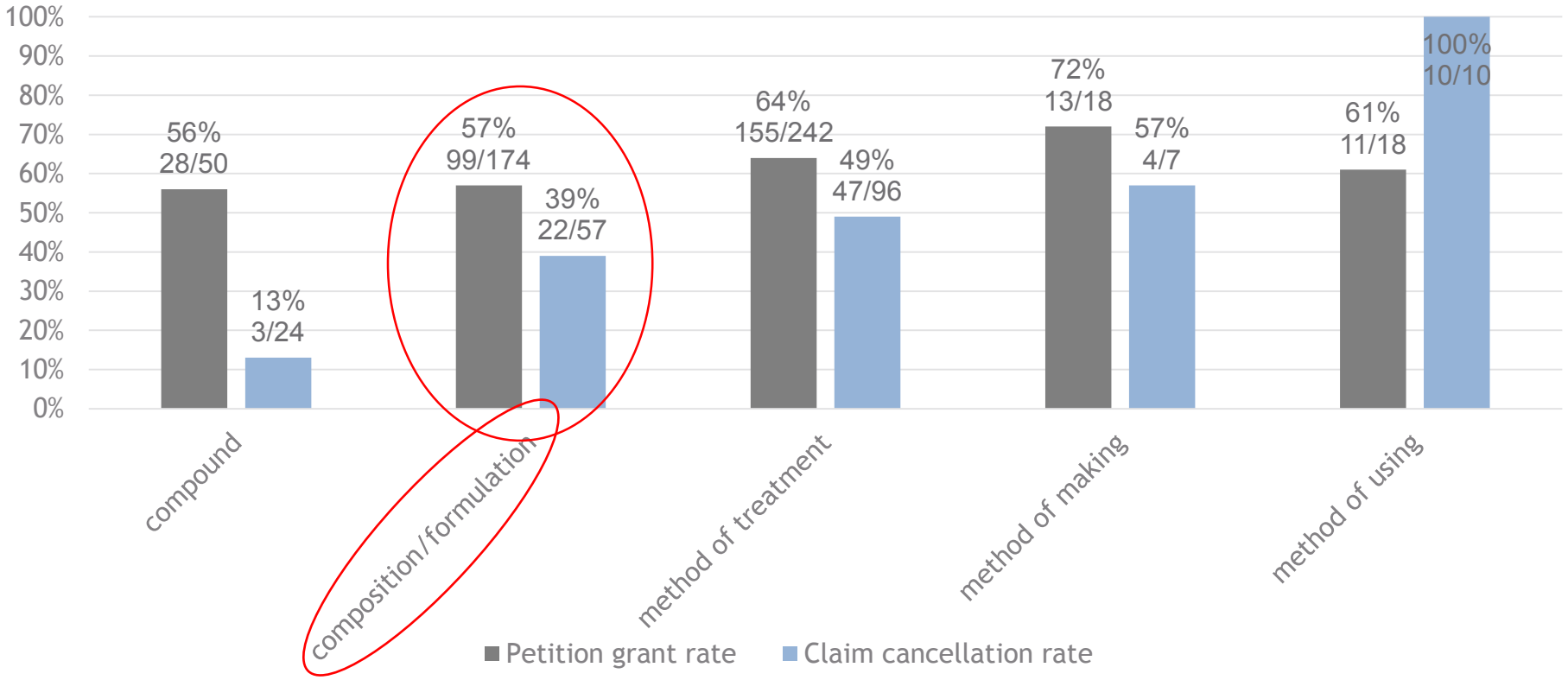
Pharmaceutical Formulation Claims: Recent PTAB Treatment

Composition/Formulation Claims in Pharma IPR Petitions



Source: Finnegan research; Oct. 16, 2019. Based on 495 IPR pharma petitions with types of claims identified; may be more than one type of claim per petition.

Grant Rate and Cancellation Rate by Type of Claim: Comp/Form Lower Than Others



Source: Finnegan research; Oct. 16, 2019. Based on 495 IPR pharma petitions with types of claims identified; may be more than one type of claim per petition. Institution rate = granted/granted+denied. "Granted" includes instituted on at least one claim for those petitions filed pre-*SAS*. FWD success rate calculated based on "all claims unpatentable" or "all claims survived." "Mixed" outcomes not included, nor are adverse judgments, settlements, or granted motions to amend proposing substitute claims.

Moderna Therapeutics, Inc. v. Arbutus Biopharma Corp. (f/k/a Tekmira), IPR2018-00680, Paper 46 (P.T.A.B. Sept. 10, 2019)

- Claim 1. A composition comprising: a plurality of nucleic acid-lipid particles, wherein each particle in the plurality of particles comprises:
  a) a nucleic acid;
  b) a cationic lipid;
  c) a non-cationic lipid; and
  d) a conjugated lipid that inhibits aggregation of particles,
  wherein at least about 95% of the particles in the plurality of particles have a non-lamellar morphology.

- Issue: Is the recited morphological property recited inherent in prior art disclosing the same formulations as claimed and the method of making the formulations?

- PTAB FWD: claims unpatentable.
  - "[T]he morphology limitation of claim 1 is the 'natural result' of following the disclosure of the [prior art]."

Argentum Pharms. LLC v. Alcon Research Ltd., IPR2017-01053, Paper 52 (P.T.A.B. Sept. 20, 2018)

Claim 1. A multi-dose, self-preserved ophthalmic composition, comprising:

- zinc ions at a concentration of 0.04 to 0.4 mM; and
- borate and polyol, the borate being present in the composition at a concentration of 0.1 to 2.0% w/v and the polyol being present in the composition at a concentration of 0.25 to 2.5% w/v, the polyol comprising propylene glycol in the composition at a concentration of 0.25 to 1.25% w/v and sorbitol in the composition at a concentration of 0.05 to 0.5% w/v
- wherein: (i) the composition has a concentration of anionic species less than 15 mM; and (ii) the composition exhibits sufficient antimicrobial activity to allow the composition to satisfy USP 27 preservative efficacy requirements.

Argentum Pharms. LLC v. Alcon Research Ltd., IPR2017-01053, Paper 52 (P.T.A.B. Sept. 20, 2018)

- PTAB FWD: Claim 1 not unpatentable for obviousness.
  - "self-preserved" in preamble found to be a limitation.
    - Prior art formulation included two conventional antimicrobial preservatives; excluded from the "self-preserving" composition of claim 1.
  - Prior art formulation would require at least 6 modifications to arrive at claimed formulation.
    - Modification choices based on impermissible hindsight.
  - Further limitation requires composition that meets USP 27 preservative efficacy requirements; no persuasive evidence that this limitation was "necessarily" present or the natural result of combining the elements disclosed in the prior art.

Argentum Pharms. LLC v. Alcon Research Ltd., IPR2017-01053, Paper 52 (P.T.A.B. Sept. 20, 2018)

- PTAB FWD: Claim 1 not unpatentable for obviousness
  - Objective evidence of nonobviousness.
    - Commercial success
      - Market share
      - Number of prescriptions
      - Travatan Z outperformed Travatan, even though it has the same active ingredient in same concentration – only difference is use of the claimed zinc-based preservation system
      - Claimed self-preserved feature confers a benefit over alternative products
    - Long-felt need

Take-Aways

- Beware of possible inherency argument if there is a property limitation in the claim.
- Rationale for proposed modifications to prior art (both why and how to make them must be supported by evidence; not conclusory statements nor hindsight.
- Show nexus between objective evidence and merits of claimed invention.

Biosimilar Formulation Claims: Recent Court Treatment

Janssen Biotech, Inc. v. Celltrion Healthcare Co., (D. Mass. July 30, 2018), appeal pending

- Janssen's product, Remicade (infliximab).
- Janssen sued Celltrion and Hospira for DOE infringement of U.S. 7,598,083.
- Defendants' infliximab biosimilars are Inflectra and Remsima, respectively.
- Producing the infliximab antibody requires use of a cell culture medium.
  - Claim 1 recites a "soluble composition[] suitable for producing a final volume of cell culture media" "comprising" 61 ingredients for the media and a concentration range for each.
  - Parties agree that only 52 of the 61 ingredients are "required" by the claim because nine of the ingredients recite a concentration range with a low end of zero.
  - Accused media has all 52 ingredients required by claim 1, as well as additional ingredients, but several of the claimed ingredients are present in amounts outside the ranges recited the claim.

Janssen Biotech, Inc. v. Celltrion Healthcare Co., (D. Mass. July 30, 2018), appeal pending

- Celltrion moved for summary judgment of noninfringement because Janssen's asserted scope of equivalents would ensnare the prior art.

- Hypothetical claims include all 61 ingredients recited with concentration ranges extended where necessary to match the concentrations used by Celltrion.

- Celltrion produced two references not considered by the USPTO during examination.

Janssen Biotech, Inc. v. Celltrion Healthcare Co., (D. Mass. July 30, 2018), appeal pending

- DC: Granted.
  - "no reasonable factfinder could conclude that the hypothetical claims that Janssen relies upon to avoid ensnarement would have been patentable because they were obvious rather than inventive."
    - "Janssen has not proven that the hypothetical claims would have been patentable over" the prior art references.
  - A POSITA "would have had the ability and motivation to combine familiar ingredients from prior art cell culture media compositions in predictable concentrations to create what Janssen claims as its hypothetical invention. Moreover, the POSA would have predicted the combination's successful results."

Janssen Biotech, Inc. v. Celltrion Healthcare Co., (D. Mass. July 30, 2018), appeal pending

- DC: Granted.
  - Lead compound analysis not required.

  - "the [prior art] GSK medium combined 50 of 52 ingredients required by the hypothetical claims, and for those 50 shared ingredients, the concentration ranges disclosed in GSK partially overlap with the concentration ranges in the hypothetical claims. Similarly, the [prior art] Life Techs medium combined 47 of 52 ingredients required by the hypothetical claims, and for those 47 shared ingredients, 46 have partially overlapping concentration ranges."

  - Janssen's expert explained that "there was a 'convergence of opinion' in the field about 'the range of components' needed to grow cells" and "testified that there were 'plateau[s]' of 'interchangeable' concentration ranges for each ingredient and that the claimed ranges were not 'precise' or 'critical.'"

Janssen Biotech, Inc. v. Celltrion Healthcare Co., (D. Mass. July 30, 2018), appeal pending

- DC: Granted.
  - POSA would been motivated to produce variations of the GSK and Life Techs compositions
    - Directed to the same problem Janssen faced: reducing the risk of contamination by using a serum-free and animal component-free medium
  - "the fact that a POSA would have expected that any one of many combinations of ingredients would work —even if he or she did not know which one would produce the best growth - does not make each one of them nonobvious."
  - "the overlapping concentration ranges would have been optimized through only routine experimentation[.]"
  - Evidence of copying insufficient to outweigh case of obviousness established by first three *Graham* factors.

Predictable

- "The claimed hypothetical media merely altered the serum-free media formulations disclosed in GSK and Life Techs by substituting several ingredients for known alternatives, and those alternatives performed according to their previously established functions of delivering particular nutrients to cells."

- "There is no evidence that the claimed formulations yielded anything other than the predictable result that GSK and Life Techs also achieved …. Furthermore, the growing market demand for serum—free media, as well as the reasonable expectation that the GSK and Life Techs media formulations would work if one replaced certain salt forms of active nutrients with known substitutes, would have motivated a POSA to make the hypothetically claimed media formulations."

- "the prior art did not teach away from using [ferric ammonium citrate] in a cell culture medium. To the contrary, the prior art as a whole taught the desirability of the claimed combination of ingredients."

Biosimilar Formulation Claims: Recent PTAB Treatment

ORENCIA® (Abatacept) Final Written Decision

- *Momenta Pharms., Inc. v. BMS*, IPR2015-01537, Paper 37 (P.T.A.B. Dec. 22, 2016)
  - Claim 1. A stable formulation suitable for subcutaneous administration comprising
    1) at least 100mg/ml CTLA4Ig molecule,
    2) a sugar selected from the group consisting of sucrose, lactose, maltose, mannitol and trehalose and mixtures thereof and
    3) a pharmaceutically acceptable aqueous carrier,

    wherein the formulation has a
    4) pH range of from 6 to 8 and
    5) a viscosity of from 9 to 20 cps, and
    6) the weight ratio of sugar:protein is 1.1:1 or higher.
  - Claim 7. A stable formulation comprising
    1) the CTLA4Ig molecule having the amino acid sequence shown in SEQ ID NO:2 starting at methionine at position 27 or alanine at position 26 and ending at lysine at position 383 or glycine at position 382 in an amount of about 125 mg/ml,
    2) sucrose in an amount of about 170 mg/ml,
    3) at least one buffering agent,
    4) sterile water for injection and
    5) optionally a surfactant.

ORENCIA® (Abatacept) Final Written Decision

- *Momenta* (con't)
  - Petitioner: Obvious over Cohen, Carpenter, and Shire.
    - Cohen teaches that CTLA4Ig was a known protein with known therapeutic effects in known amounts and that CTLA4Ig requires chronic administration every two to twelve weeks.
    - Shire teaches that subcutaneous injection allows for home administration and, thus, improved compliance.
    - Carpenter teaches that even though it was known that proteins could be unstable in the relatively high concentrations required for subcutaneous formulations, a limited set of possible excipients could be used to develop a stable liquid protein formulation.
    - Carpenter teaches that sucrose was known to be a "first-line choice" stabilizer for liquid protein formulations and using high concentrations of sugars to stabilize proteins, in ranges overlapping the recited ranges.
  - Patent Owner: achieving a stable liquid formulation of a protein at the time of the invention was an unpredictable and highly protein-specific challenge.

No Reasonable Expectation of Success

- *Momenta* (con't)
  - PTAB: FWD all claims survived.
    - Statements in Carpenter cast doubt on reasonable expectation of success.
    - Prior art provides general guidance, but not sufficient to provide a POSITA with a reasonable expectation of success.

HUMIRA® (Adalimumab)

- *Coherus Biosciences, Inc. v. AbbVie Biotech. Ltd.*, IPR2017-01008, Paper 11 (P.T.A.B. Sept. 7, 2017)

  - 9,085,619 Claim 16. 16. An aqueous pharmaceutical formulation comprising:

    a) (a) an anti-tumor necrosis factor alpha antibody comprising a light chain variable region (LCVR) having a CDR3[3] domain comprising the amino acid sequence of SEQ ID NO:3, a CDR2 domain comprising the amino acid sequence of SEQ ID NO:5, and a CDRl domain comprising the amino acid sequence of SEQ ID NO: 7, and a heavy chain variable region (HCVR) having a CDR3 domain comprising the amino acid sequence of SEQ ID NO:4, a CDR2 domain comprising the amino acid sequence of SEQ ID NO: 6, and a CDRl domain comprising the amino acid sequence of SEQ ID NO:8, wherein the concentration of the antibody is 50 to 200 mg/ml; and

    b) water;

    wherein the formulation does not comprise a buffering system.

Must Show Reason to Combine

- *Coherus* (con't)
  - Petitioner: Obvious in view of the 2003 Humira label, Fransson, Gokarn '011.
  - PTAB: Denied institution.
    - "[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007).
    - Did not show why a POSITA would be motivated to eliminate the buffer system of the Humira label or, even if did, that a POSITA would have had a reasonable expectation of success in achieving the claimed subject matter.
    - "Petitioner's arguments and Dr. Radtke's testimony disregard the known challenges and unpredictability in the field of antibody formulation."
    - "it was known in the 2006–2007 timeframe (i.e., after the filing date of Gokarn Provisional), and thereafter, that a successful formulation for one antibody would not necessarily work for another antibody, even if the two antibodies shared similar structures."

Biologics Too
Limitations Found in Prior Art

- *Ex parte Kobayashi*, Appeal No. 2018-004333 (P.T.A.B. June 26, 2019)
  - 13/972,532 Claim 1. A phototoxic pharmaceutical composition for the treatment of a cancer expressing HER1, HER2 or PMSA, comprising:
    - a phototoxic conjugate comprising an IR700 molecule conjugated to an antibody that binds to a cell surface protein, wherein the antibody is selected from the group consisting of Panitumumab, Trastuzumab, and J591 or an antigen binding fragment thereof; and
    - a pharmaceutical carrier, wherein the phototoxic conjugate exhibits phototoxicity to kill cells expressing the cell surface protein bound by the antibody or antigen binding fragment of the conjugate.
  - Known in the art:
    - Panitumumab and Trastuzumab could be conjugated to a near-infrared ionophore, for example to ICG.
    - the near infrared fluorescence labeling reagent IR700 could be conjugated to antibodies.
    - IR700 was characterized in the prior art as having several advantages.

Objective Evidence of Nonobviousness: Unexpected Results

- *Kobayashi* (con't)
  - PTAB: The examiner erred in assessment of objective evidence of unexpected results.
    - "Appellants present persuasive evidence that the claimed composition is unexpectedly phototoxic against cancer cells displaying the antigen of the cognate antibody. Appellants present [expert]testimony … that it was surprising that antibody-IR700 molecules effectively treat tumor cells, given that IR700 without an attached antibody is ineffective. [The experts] support[ed] their testimony with data[.]"
    - Specification showed example that irradiated IR700 alone did not increase the survival of mice, but irradiated Pan-IR700 conjugate resulted in a significant increase in survival time. Expert testimony that other treatments (Pan-IR700 conjugate without irradiation, antibody alone, irradiation alone) failed to increase survival for comparison.
    - Expert testimony of unexpected result that "IR 700-MAb conjugates of the current invention do not require cellular internalization for their therapeutic effectiveness."
    - "even if one of ordinary skill in the art would have had reason to combine the teachings of the prior art to make Pan-IR700 and Tra-IR700, the phototoxic properties of the conjugate would have been unexpected."
    - "Whether or not other antibody-IR700 conjugates would also be phototoxic does not negate that at the time of Appellants' filing, given the cited knowledge in the art, the phototoxic nature of the claimed composition would have been unexpected."

Means-Plus-Function Claims

Means-Plus-Function Claims

Section 112(f): "an element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."

A tool for patent applicants to, in a controlled way, literally cover equivalents by providing for literal infringement by structure that performs the same function.

Statutory Construction = B.R.I.

In re Donaldson, 16 F.3d 1189 (Fed. Cir. 1994) (*en banc*)

- Per our holding, ***the "broadest reasonable interpretation" that an examiner may give means-plus-function language is that statutorily mandated in paragraph six***. Accordingly, the PTO may not disregard the structure disclosed in the specification corresponding to such language when rendering a patentability determination.

Statutory Construction = B.R.I.

M.P.E.P. § 2181 [R-08.2017]

Therefore, the broadest reasonable interpretation of a claim limitation that invokes 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, is the structure, material or act described in the specification as performing the entire claimed function and equivalents to the disclosed structure, material or act. *As a result, section 112(f) or pre-AIA section 112, sixth paragraph, limitations will, in some cases, be afforded a more narrow interpretation than a limitation that is not crafted in "means plus function" format*.

Means-plus-function Claims In Pharma

Federico's Commentary:

- The last paragraph of section 112 relating to so-called functional claims is new. It provides that an element of a claim for a combination (and a combination may be not only a combination of mechanical elements, **but also a combination of substances in a composition claim**, or steps in a process claim) may be expressed as a means or step for performing a specified function, without the recital of structure, material or acts in support thereof.

MPEP §2181

MPF Claims In Pharma

Example:

- 1. A composition comprising:
  - component A and
  - means for [achieving some desirable outcome].

MPF Claims In Pharma

- Broader literal claim scope can help when doctrine of equivalents fading.
- May provide more accuracy and clarity than purely structural characterization.
- See Wanli Tang, "Revitalizing the Patent System to Incentivize Pharmaceutical Innovation: The Potential of Claims with Means-Plus-Function Clauses," 62 Duke L.J. 1069 (2013).
  - http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=3378&context=dlj

An Issued Life Science MPF Claim!

Ex parte Gleave, Appeal No. 2012-004973 (2014)

- U.S. Patent 8,722,872
- Board reversed the examiner's rejection.
- Interesting because PTAB approved MPF introduced during prosecution.
- MPF was used on the active ingredient, with the carrier being in traditional, broad form.
- Claim 33. A pharmaceutical composition comprising a
  a) means for reducing the amount of active hsp27 in cancerous cells and
  b) a pharmaceutically acceptable carrier.

Treatment of a Life Science MPF Claim

- The specification does not say "means for."
- The genealogy involved continuations and provisionals going back to 2002, and this plays into the story:
  - **Related U.S. Application Data**
    - Continuation of application No. 11/422,481, filed on Jun. 6, 2006, now Pat. No. 7,550,580, which is a
    - Continuation of application No. 10/605,498, filed on Oct. 2, 2003, now Pat. No. 7,101,991.
    - Provisional application No. 60/463,952, filed on Apr. 18, 2003,
    - Provisional application No. 60/415,859, filed on Oct. 2, 2002.

Context for the Life Science MPF Claim

- The parent '580 patent did not involve means-plus-function. Independent claim 1 (all other claims are dependent) reads:

1. A pharmaceutical composition comprising a therapeutic agent effective to reduce the amount of active hsp27 in cancerous cells exposed to the therapeutic agent, and a pharmaceutically acceptable carrier, wherein the therapeutic agent is an antisense oligonucleotide having a sequence complementary to a portion of SEQ ID NO: 91, wherein the antisense oligonucleotide comprises at least ten bases complementary to the portion, wherein the portion is bases 551-580 of SEQ ID NO: 91, and wherein the antisense oligonucleotide is 12 to 35 nucleotides in length.

Further Context for the Life Science MPF Claim

- The parent '991 patent did not involve means-plus-function. Independent claim 1 (all other claims are dependent) reads (typo "to 82" was corrected in a certificate of correction):

  - 1. A pharmaceutical composition comprising a therapeutic agent effective to reduce the amount of active hsp27 in cancerous cells exposed to the therapeutic agent, and a pharmaceutically acceptable carrier, wherein the therapeutic agent is an oligonucleotide and wherein the oligonucleotide is an antisense oligonucleotide comprising the sequence of bases as set forth in Seq. ID Nos. 81 or to 82.

Context for a Life Science MPF Claim: The Fun Begins

- The application ultimately resulting in the '872 Gleave patent started off innocuously enough, with independent claims 1 and 14 being presented (nothing about "means for"):

  - 1. A method for treatment of a cancer characterized by elevated expression of hsp27 as compared to non-cancerous tissue of the same type in an individual suffering from the cancer, comprising the step of administering to the individual a therapeutic composition effective to reduce the amount of active hsp27 in the cancer cells.

  - 14. A pharmaceutical composition comprising a therapeutic agent effective to reduce the amount of active hsp27 in cancerous cells exposed to the therapeutic agent, and a pharmaceutically acceptable carrier.

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- On the filing date, however, a preliminary amendment was filed canceling all claims and presenting independent claims 25 and claim 33, introducing "means for" and thus being interesting for this discussion:
  - 25. (new) A pharmaceutical composition comprising a therapeutic agent effective to reduce the amount of active hsp27 in cancerous cells exposed to the therapeutic agent, and a pharmaceutically acceptable carrier, wherein the therapeutic agent is an antisense oligonucleotide having a sequence complementary to SEQ. ID NO. 91, wherein the oligonucleotide comprises at least ten bases complementary to bases 744-764 of SEQ. ID NO. 91, and wherein the antisense oligonucleotide is 12 to 35 nucleotides in length.
  - 33. (new) A pharmaceutical composition comprising a (a) **means for** reducing the amount of active hsp27 in cancerous cells **by sequence specific interaction with Seq. ID No. 91** and (b) a pharmaceutically acceptable carrier.

(The "sequence specific" language ultimately was removed)

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- The preliminary amendment also presented claims 34 and 35, depending directly or indirectly from claim 33:

  - 34. (new) The pharmaceutical composition of claim 33, wherein the means for reducing the amount of active hsp27 in cancer cells is an oligonucleotide, and the oligonucleotide consists of 12 to 35 nucleotides.

  - 35. (new) The pharmaceutical composition of claim 34, wherein the oligonucleotide is an antisense oligonucleotide complementary to Seq. ID No. 91.

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- Of the means-plus-function claims, applicants carried the fight to the USPTO:
  - "In the new claim set, claims 33-35 are also presented directed to a generic pharmaceutical composition in which the active ingredient is referred to in means plus function language. It is intended to invoke 35 USC § 112, sixth paragraph, such that this refers to the compositions disclosed in the application that accomplish this function, and equivalents thereof."

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- There was then a non-final rejection. The PTO rejected claims 33-35.
  - The PTO found that claims 33-35 were not entitled to an effective date of the 2002 and 2003 provisional applications.

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- In particular:
  - "The disclosure of the prior-filed applications fail to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. None of the applications disclose the limitations of newly added claims 33 and 34. It is noted that this does not constitute new matter because the amended claims were filed on the instant filing date. However, the claim language is not supported by the instant specification or the priority documents.
  - Specifically, the documents do not disclose a pharmaceutical composition comprising any means for reducing the amount of active hsp27 in cancerous cells by sequence specific interaction with SEQ ID NO: 91; and do not disclose wherein the means is an oligonucleotide consisting of 12-35 nucleotides, as it appears as if the only disclosure of oligonucleotides of this length are antisense oligonucleotides, as required by claim 35.
  - Therefore, claims 33 and 34 are accorded an effective filing date of 6/23/09. the filing date of the instant application." (emphasis in the original)

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- The USPTO further stated:
  - "With regards to the means plus function language of claim 33, the instant specification does not describe any means for reducing the amount of active hsp 27 via sequence specific interaction other than by antisense oligonucleotide or RNAi inhibition.
  - Therefore, the claims are broader than the instant disclosure, as this is not a defined genus that has been described by the specification. The specification does not have a sufficient disclosure of the structure that corresponds to the claimed function. Means plus-function claims require disclosure in the specification even if the means are already well known in the art. It is not clear what structure is required to meet the limitation of resulting in sequence specific interaction, but clearly this would include triplexes, miRNA molecules, and aptamers, which are not disclosed in the specification."

Examiner Treatment of a Life Science MPF Claim: The Fun Begins

- The USPTO also made a written description rejection:
  - "One of ordinary skill in the art would not be able to recognize that applicant was in possession of any other types of oligonucleotides with the instantly required structural characteristics that would result in the intended function.The instant specification does not describe any means for reducing the amount of active hsp 27 via sequence specific interaction other than by antisense oligonucleotide or RNAi inhibition. Therefore, the genus of means for reducing hsp27 via sequence specific interaction is an undefined genus and therefore one of ordinary skill would not be able to readily recognize what means are intended to be included or excluded from this genus and what is required to meet the limitation of sequence specific interaction. Therefore, the skilled artisan would not be able to recognize that applicant was in possession of the instant genus at the time of filing."
  - The USPTO also rejected claims 33-34 as anticipated and rejected claims 33-35 as anticipated by Baracchini, a reference that would hang over the claims all the way to the decision on appeal reversing that rejection years later.

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Applicants responded, adding a new claim 36, depending from claim 33.
  - 36. (new) The pharmaceutical composition of claim 33, wherein the means for reducing the amount of active hsp27 in the cells is a double-stranded RNA molecule.

- and arguing (going right after the Examiner's failure to construe the claims as MPF:
  - "As pointed out in the preliminary amendments, however, 'it is intended to invoke 35 USC § 112, sixth paragraph, such that this refers to the compositions disclosed in the application that accomplish this function, and equivalents thereof.' The Examiner has failed to make a determination of the scope of the claims using the standards of this section of the statute, but rather has asserted a scope that is seemingly broader than the claim scope. See MPEP § 2181. Applicants submit that this step must be performed before the Examiner can properly apply any rejection."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- The PTO then issued a final rejection regarding MPF claims 33-36:
  - Lack of priority, including an argument of lack of enablement:
    - "The disclosure of the prior-filed applications fail to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. None of the applications disclose the limitations of newly added claims 33 and 34. It is noted that this does not constitute new matter because the amended claims were filed on the instant filing date. However, the claim language is not supported by the instant specification or the priority documents.
    - Specifically, the documents do not disclose a pharmaceutical composition comprising any means for reducing the amount of active hsp27 in cancerous cells by sequence specific interaction with SEQ ID NO: 91; and do not disclose wherein the means is a noligonucleotide consisting of 12-35 nucleotides, as it appears as if the only disclosure of oligonucleotides of this length are antisense oligonucleotides, as required by claim 35."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- The PTO also, in addition to anticipation rejections, made an effort at addressing MPF:
  - "With regards to the means plus function language of claim 33, the instant specification does not describe any means for reducing the amount of active hsp 27 via sequence specific interaction other than by antisense oligonucleotide or RNAi inhibition. Therefore, the claims are broader than the instant disclosure, as this is not a defined genus that has been described by the specification. The specification does not have a sufficient disclosure of the structure that corresponds to the claimed function. Means plus-function claims require disclosure in the specification even if the means are already well known in the art. It is not clear what structure is required to meet the limitation of resulting in sequence specific interaction, but clearly this would include triplexes, miRNA molecules, and aptamers, which are not disclosed in the specification."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- In addition, the PTO stated further that the MPF claims for failing to satisfy the written description requirement.
  - "Claims 33 and 34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Finally, PTO rejected MPF claims as anticipated, continuing to focus on Baracchini:

  - The instant claims are directed to a pharmaceutical composition comprising a means of reducing active hsp27 in cancer cells by sequence specific interaction with SEQ ID NO: 91 and a pharmaceutically acceptable carrier, wherein the means is an oligonucleotide consisting of 12 to 35 nucleotides.

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Claims 33-35 are rejected under 35 U .S.C. 102(b) as being anticipated by Baracchini et al. (U.S. 5,801, 154). The instant claims are directed to a pharmaceutical composition comprising a means of reducing active hsp27 in cancer cells by sequence specific interaction with SEQ ID NO: 91 and a pharmaceutically acceptable carrier, wherein the means is an oligonucleotide consisting of 12 to 35 nucleotides . . . .
- Therefore, any composition comprising an antisense oligonucleotide that has a sequence (of any size within the oligonucleotide) that is complementary to any sized portion of instant SEQ ID NO: 91 and a pharmaceutically acceptable carrier anticipates the instant claims. As stated in the MPEP (see MPEP 2112), something that is old does not become patentable upon the discovery of a new property.
- Therefore, the instant claims are anticipated by Baracchini et al.
- The Office stated: "The instant claims are not limited to the specific oligonucleotides exemplified in the specification and the oligonucleotide of Baracchini et al. meets the instant structural limitations. In order for the instant claim scope to be enabled, the compound of Baracchini et al. would result in the claimed function."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Responding after final, applicants urged:
  - Applicants submit that the rejections and the assertion concerning the priority date for these claims are in error because of a failure to correctly construe a claim drafted in means-plus-function language.
  - **"Here, claims 33 and 34 are directed to a combination (a pharmaceutical composition) and one of the elements is recited in mean-plus-function format. Thus, the first thing the Examiner must do in determining the scope of the claims is to consult the specification to see the structures, materials or acts described in the specification . . . ."**
  - "By law, claims 33 and 34 have a scope which is the disclosed structures, plus equivalents. If the Examiner is arguing that triplexes, miRNA molecules and aptamers are **equivalents** of the disclosed antisense and siRNA, then these embodiments fall within the scope of the original disclosure and are entitled to the priority date of at least April 18, 2003. If on the other hand (as appears from the written description rejection) the Examiner is asserting that these are not equivalent, then these options are not within the scope of the claim, and applicants are still entitled to at least a priority date of April 18, 2003 for Claims 33 and 34. Clarification of the Examiner's interpretation of the claims is requested."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Applicants further urged:
  - "Claims 33 and 34 are rejected under 35 USC § 112, first paragraph as lacking written description. The Examiner specifically identifies two means for accomplishing the stated function, but argues that the claims are broader than this. **The only way this could be legally true is if the alternatives are art-recognized equivalents of the specifically named structures (i.e. antisense and siRNA).** The Examiner has not taken a position as to whether or not the structures that make up the allegedly not described scope are art recognized equivalents . . . ."

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Applicants argued against the anticipation rejections, focusing on Baracchini, which as noted would not go away until PTAB inserted itself and reversed.

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- Claims 33-35 stand rejected as anticipated by US Patent No. 5,801,154. Applicants then made another text book argument:
  - **In order to anticipate a means-plus-function limitation, Baracchini would have to disclose a sequence that (1) performed the function of reducing hsp27; and which (2) was identical to or the equivalent of a structure disclosed in the application. The Examiner has not made either of these showings.**
  - Baracchini's SEQ ID No. 3 is not identified as being able to reduce hsp27, and the **Examiner has not argued that such activity is expected to be inherent in the Baracchini sequence. Without such a showing, there can be no anticipation**.
  - Furthermore, the Examiner has not identified a specific structure in the present application to which Baracchini is equivalent. The Examiner has not made any case that Seq ID No. 3 of Baracchini is equivalent to either of the two closest sequences in the Gleave application. Thus, there is no basis for a rejection for anticipation when the claims are properly interpreted in accordance with 35 USC§ 112, sixth paragraph.

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- The USPTO issued an advisory action, ruling that the reply did not place the application in condition for allowance, making a different argument.

- With regards to priority, claims 33 and 34 are accorded an effective filing date of 6/23/09 . . . . It is agreed that scope of the means is determined via the disclosure in the specification. . . . Means-plus-function claims require disclosure in the specification. It is not clear what structure is required to meet the limitation of sequence specific interaction, as this terminology is extremely broad and not utilized in the specification.

- Not yet, but ultimately, the "sequence specific" language would be removed from claim 33.

Examiner Treatment of a Life Science MPF Claim: The Fun Continues

- With regards to Baracchini et al., the USPTO urged that the office action mailed 8/5/10 sets forth that Baracchini et al. teaches an antisense oligonucleotide that meets each of the instant structural limitations, which is what is required for anticipation . . . . Therefore, since the compound meets each of the structural limitations it would necessarily act as claimed absent evidence to the contrary.

Examiner Treatment of a Life Science MPF Claim: Appeal and Reversal

- Applicants engaged in a pre-brief appeal conference.
- The rejection was withdrawn in view of applicant's brief in its pre-brief conference request.
- The brief sounded the familiar themes of priority date, claim construction under §112,6, written description, enablement, and lack of anticipation.

Examiner Treatment of a Life Science MPF Claim: Appeal and Reversal

- For example, on claim construction, applicants said:
  - Here, claims 33 and 34 are directed to a combination (a pharmaceutical composition) and one of the elements is recited in mean-plus-function format. **Thus, the first thing the Examiner must do in determining the scope of the claims is to consult the specification to see the structures, materials or acts described in the specification. The specification must be consulted to determine the structure, material, or acts corresponding to the function recited in the claim . . . The Examiner has not done so.**
  - The structures that are disclosed in specification for accomplishing the stated function (reducing the amount of active hsp27 in cancerous cells by sequence specific interaction with Seq ID No. 91) are certain n antisense oligonucleotides, and certain sense strands of an double-stranded inhibitory RNA molecule.
  - Thus, the proper scope of the claims is these sequences, and the equivalents thereof. The Examiner, however, has interpreted the claims as encompassing anything capable of achieving the stated function. This is an improper application of the relevant law.

Examiner Treatment of a Life Science MPF Claim: Second Time Around

- After prosecution was reopened, applicants received yet another nonfinal rejection. In addition to making the same priority application analysis, the USPTO made a written description rejection, a prior art rejection, and a new indefiniteness rejection under §112(b):

  - **With regards to the means plus function language of claim 33, the instant specification does not describe any means for reducing the amount of active hsp 27 via sequence specific interaction other than by antisense oligonucleotide or RNAi inhibition.**

  - Therefore, the claims are broader than the instant disclosure, as this is not a defined genus that has been described by the specification. The specification does not have a sufficient disclosure of the structure that corresponds to the claimed function. Means plus-function claims require disclosure in the specification even if the means are already well known in the art. **It is not clear what structure is required to meet the limitation of resulting in sequence specific interaction, but clearly this would include triplexes, miRNA molecules, and aptamers, which are not disclosed in the specification**.

Examiner Treatment of a Life Science MPF Claim: The Second Time Around

- The rejection under §112(b) of claims 34 and 35 stated:
  - The claim limitation "means for reducing the amount of active hsp27 in cancer cells" uses the phrase "means for" or "step for", **but it is modified by some structure, material, or acts recited in the claim.** It is unclear whether the recited structure,material, or acts are sufficient for performing the claimed function which would preclude application of 35 U.S.C. 112, sixth paragraph, because **it is not clear whether the claims are intended to infer a structure**. The **sequence specific interaction language infers a structure and therefore would not fall under 112, 6**.
  - If applicant wishes to have the claim limitation treated under 35 U.S.C. 112, sixth paragraph, applicant is required to amend the claim so that the phrase "means for" or "step for" is clearly **not** modified by sufficient structure, material, or acts for performing the claimed function.
  - If applicant does **not** wish to have the claim limitation treated under 35 U.S.C.112, sixth paragraph, applicant is required to amend the claim so that it will clearly not be a means (or step) plus function limitation (e.g., deleting the phrase "means for" or "step for"). **Amendment to claim 33 to delete "by sequence specific interaction with SEQ ID NO: 91" would clearly result in a claim that would be treated under 35 U.S.C. 112, sixth paragraph.**

Examiner Treatment of a Life Science MPF Claim: Appeal and Reversal

- In response, applicants amended claim 33 as follows but did not amend any claim depending, directly or indirectly, from claim 33:

- Claim 33. (currently amended) A pharmaceutical composition comprising a
  - (a) means for reducing the amount of active hsp27 in cancerous cells [by sequence
  - specific interaction with Seq. ID No. 91] and
  - (b) a pharmaceutically acceptable carrier.

- Dependent claims 34-36 continued to read:
  - 34. (previously presented) The pharmaceutical composition of claim 33, wherein the means for reducing the amount of active hsp27 in cancer cells is an oligonucleotide, and the oligonucleotide consists of 12 to 35 nucleotides.
  - 35. (previously presented) The pharmaceutical composition of claim 34, wherein the oligonucleotide is an antisense oligonucleotide complementary to Seq. ID No. 91.
  - 36. (previously presented) The pharmaceutical composition of claim 33, wherein the meansfor reducing the amount of active hsp27 in the cells is a double-stranded RNA molecule.

Examiner Treatment of a Life Science MPF Claim: Appeal and Reversal

- Applicants argued:

  - Claims 33 and 34 were rejected as lacking written description, as indefinite, and over prior art. In the rejection of the claims as indefinite, the Examiner proposed an amendment to overcome the rejection and clearly make the claims a means plus function claim governed by 35 USC§ 112, sixth paragraph. Applicants have made this amendment to claim 33, and thus the rejection under 35 USC§ 112, second paragraph, is overcome.

  - Applicants submit that this amendment also addresses and overcomes all of the other issues. **The denial of priority and the written description rejection are based on interpretations of the claim that are inconsistent with application of 35 USC § 112, sixth paragraph. Once this standard is applied**, then the claim is entitled to the benefit of the priority date, thus overcoming the art rejections, and is also clearly supported by a written description.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- The USPTO responded with a non-final rejection based solely on 102 and 103, based primarily on Baracchini.
- Applicants filed a notice of appeal, and tried, unsuccessfully this time, another pre-brief conference request. Applicants led with their misapplication of MPF argument:
  - Claims 33-36 are rejected under 35 USC§§ 102 (b) and 103(a). These claims contain a means-plus-function limitation. Applicants submit that the Examiner is misapplying the provisions of 3 5 USC § 112, sixth paragraph and incorrectly determining the scope of the claims and that the rejections depend on this incorrect interpretation.
  - Here, claims 33 and 34 are directed to a combination (a pharmaceutical composition) and one of the elements is recited in mean-plus-function format. **Thus, the first thing the Examiner must do in determining the scope of the claims is to consult the specification to see the structures, materials or acts described in the specification.. . . The structures that are disclosed in specification for accomplishing the stated function (reducing the amount of active hsp27 in cancerous cells by sequence specific interaction with [certain sequence IDs which are antisense oligonucleotides or the sense strand of a double-stranded inhibitory RNA molecule].** Thus, the proper scope of the claims is these sequences, and the equivalents thereof. The Examiner, however, has interpreted the claims as encompassing anything capable of achieving the stated function. This is an improper application of the relevant law.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- In order to anticipate a means-plus-function limitation, Baracchini would have to disclose a sequence that (1) performed the function of reducing hsp27; and which (2) was identical to or the equivalent of a structure disclosed in the application. The Examiner has not made either of these showings.

- **Baracchini's SEQ ID No. 3 is not identified as being able to reduce hsp27, and the Examiner has not argued that such activity is expected to be inherent in the Baracchini sequence**. Without such a showing, there can be no anticipation.
- Furthermore, the Examiner has not identified a specific structure in the present application to which Baracchini is equivalent. [explained that the Seq ID No. 3 ofBaracchini is different from the two closest specific sequences in the present application] **Although there were common parts, the Examiner made no case that Seq ID No. 3 of Baracchini is equivalent to either of these to two sequences. Since the common sequence is only 1/3 of the totality of the sequences in the application, applicant urged that such an argument would be difficult.** Thus, there is no basis for a rejection for anticipation when the claims are properly interpreted in accordance with 35 USC § 112, sixth paragraph.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- Claims 33-36 are rejected as obvious over Baracchini in view of Bertrand. This rejection depends on the same analysis of the scope claims (See Page of the office action) that bears no resemblance to the claims as now pending and which totally ignores the means plus function limitation.

- A panel of three examiners rejected these arguments, and the application proceeded to appeal.

- **Applicant urged in its appeal brief: Independent claim 33 recites "means for reducing the amount of active hsp27 in cancer cells." Thus, it uses the phrase "means for" modified by the functional language "for reducing the amount of active hsp 27 in cancer cells." Finally, the claims does not include a recitation of "sufficient structure, material, or acts for achieving the specified function."**

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- The Examiner's statement of what is claimed stands in marked contrast to the claim scope arrived at when the **correct** analysis for a means-plus-function claim is applied. **The two step analysis involved in correctly construing means-plus-function limitations is explained by the Court of Appeals for the Federal Circuit in *Golight Inc. v. Wal-Mart Stores inc*. . . . and in MPEP 2182. The first step is to define the particular function of the claim limitation. The second step is to look at the specification and identify the structure(s) that correspond to that defined function. "**[S]tructure disclosed in the specification is 'corresponding' structure only if the specification or prosecution history **clearly links** or associates that structure to the function recited in the claim."

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- If we apply this two step process to independent claim 33, **the recited function is reducing active hsp27 in cancerous cells**. It follows, then, that the structures that correspond to that defined function are those structures that are disclosed in the specification as reducing hsp27 in cancerous cells. **In the present specification, these structures are antisense oligonucleotides . . . that were tested and shown through the Examples . . . to be effective for the stated function and siRNA sequences . . . shown to be effective in Example 5.**

- The scope of a means-plus-function claims is **not** any and every structure that might possibly reduce the amount of active hsp27 in cancerous cells, nor is it every antisense oligonucleotide . . . that is complementary . . . as the Examiner has argued, **even if there is language like this in the specification that might support a broader or different claim that is not in means-plus function format. The proper scope is only the structures disclosed in the present specification and their equivalents.**

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- A rejection under 35 USC§ 102 for anticipation requires that the single cited reference disclose, either expressly or inherently, subject matter within the scope of the rejected claim. **For a means-plus-function claim, this means that the reference must disclose a structure that has the stated function, and that is the same as or equivalent to one of the structures disclosed in the specification of this application**. The Examiner puts forward Seq ID No. 3 of Baracchini as being anticipatory but this sequence meets none of these standards. **Sequence ID No. 3 of Baracchini is not identified in the reference has having the function of reducing hsp27 expression**. To the contrary, the Baracchini reference relates to antisense sequences for **an entirely different purpose**, reducing expression of multi drug resistance associated protein (MRP). (Baracchini, Col. 1, lines 20-21). Thus, there is no express teaching that the cited sequence has the function recited in the claims.

- The Examiner tries to fill this gap by arguing that "the oligonucleotide taught by Baracchini et al. meets the only structural limitations of the instant claims and would therefore necessarily possess this ability." (Office Action of July 20, 2011, Page 3). This argument is flawed for a number of reasons.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- As a means-plus-function claim, claim 33 has no express structural limitations . . . . There is no reason or rationale other than this faulty extension of the logic about identical structures that would lead a person skilled in the art who was actually employing their knowledge of the art to have any expectation of activity with respect to hsp27. As the Examiner notes on Page 3 of the office action, only 7 bases out of the 20 bases in Baracchini Seq ID No. 3 are complementary to the sequence of hsp27 provided in the present application (Seq ID No. 91).

- **The Examiner has provided no evidence that a sequence that has only 7 /20 bases complementary has ever been observed to have antisense activity against any target.**

- Even if Baracchini Seq ID No. 3 did have the stated function of reducing the amount of hsp27, however, this would not be sufficient to establish anticipation of a means-plus-function claim. **It would also be necessary for the Examiner to show that Seq ID No. 3 was the same as or equivalent to a specific sequence disclosed in the present application. The Examiner has made no attempt to provide such a showing, and Appellants submit that no such showing could be made.**

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- Thus, while Baracchini et al. may disclose an antisense oligonucleotide that consists of 20 nucleotides, and the antisense oligonucleotide may include some number of bases that are the same as bases in sequences disclosed in the present invention, **there is no basis to conclude that Baracchini et al. Seq ID No. 3 has the required function, and no argument presented to show that it is equivalent to a structure disclosed in this application.**

- Accordingly, the Office has not established a *prima facie* case of anticipation against independent claim 33 or any claims depending therefrom.

- Applicant then dropped the hammer with a policy argument:
  - Indeed, the Examiner and her art unit appear to be making every effort to avoid having to actually apply proper mean plus function claim interpretation in this case. Although the biotech art units may see few means plus-function claims, Appellants are not aware of any art units or technology areas that are excluded from interpreting means-plus-function limitations in the manner articulated by *In re Donaldson*. The anticipation rejection should therefore be reversed.

- Applicant made short shrift of the 103 rejection as entirely predicated on the presumed correctness of the anticipation rejection as discussed above.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- The USPTO filed an answer :
  - Therefore, any composition comprising an antisense oligonucleotide that has a sequence (of any size within the oligonucleotide) that is complementary to any sized portion of instant SEQ ID NO: 91 and a pharmaceutically acceptable carrier anticipates the instant claims. As stated in the MPEP (see MPEP 2112), something that is old does not become patentable upon the discovery of a new property.
  - Therefore, the instant claims are anticipated by Baracchini et al.
  - The Office defended the 103 rejection at length. Of note the Office stated: The specification does not set forth **any stringency requirement or specific structure required to have sequence specific interaction with SEQ ID NO: 91 and therefore the compounds of the prior art are considered equivalents to the instant claim language given the ambiguity of the instant specification. The Office noted that it is the instant specification that establishes the scope of equivalents and the specification does not require any specific level of complementarity. The examiner has interpreted the instant means-plus-function claims in view of the instant disclosure, which is not limited only to the specific sequences exemplified**.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- Aware of applicant's policy shot across the bow, the PTO concluded:
  - Although applicant argues that manner that means-plus-function claims are interpreted by the examiner's art unit, the examiner has interpreted the claim in light of the disclosure of the specification. The instant claims are not limited to the specific oligonucleotides exemplified in the specification and **the oligonucleotide of Baracchini et al. meets the structural limitations set forth in the instant disclosure. In order for the instant claim scope to be enabled, the compound of Baracchini et al. would result in the claimed function**.

Examiner Treatment of a Life Science MPF Claim: Second Appeal

- Applicants filed a reply, along with request for oral hearing.

- Basically, applicants beat the drum of what a MPF claim is and how it is to be construed. For example, the Examiner appears to disagree with Appellants' assertion that the Examiner is required to show that the prior art was the same as or equivalent to a specific sequence disclosed in the instant Specification. The Examiner is correct, but not for the reason asserted. MPEP§ 2182 states that:
  - **if a prior art reference teaches identity of function to that specified in a claim, then under *Donaldson* an examiner carries the initial burden of proof for showing that the prior art structure or step is the same as or equivalent to the structure, material,or acts described in the specification which has been identified as corresponding to the claimed means or step plus function.**
- **Barrachini et al. does not teach identity of function to that specified in the claim. Accordingly, the Examiner is not required to show any equivalency because the initial requirement** – identity of function-has not yet been met by the cited art. Had it been met (as the Examiner argues),then a showing of structural equivalency would plainly be required.

Board Treatment of a Life Science MPF Claim: Reverse Rejection

- The Board framed the issues as follows:
  - Has the Examiner properly interpreted the "means plus-function language in the claim?
  - Does the cited prior art teach a structure disclosed in the Specification as having the recited claimed function?

Board Treatment of a Life Science MPF Claim: Reverse Rejection

- Relying on *Donaldson* and other precedent, PTAB reasoned:
  - Thus, as articulated in MPEP 2181, "the USPTO *must* apply 35 U.S.C. 112, sixth paragraph in appropriate cases, and give claims their broadest reasonable interpretation, *in light of and consistent with* the written description of the invention in the application." [Emphasis added.]*(See also,* Br. 3.)
  - **A structure disclosed in the specification qualifies as a "corresponding structure" if the specification or the prosecution history "clearly links or associates that structure to the *function* recited in the claim."** *B. Braun Med.,Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997). **With means plus-function claiming, the narrower the disclosed structure in the specification, the narrower the claim coverage**. *Ibormeith IP, LLC v. Mercedes-Benz USA, LLC*, 732 F.3d 1376, 1381 (Fed. Cir. 2013). In making our determination, we apply the preponderance of the evidence standard. *See, e.g., Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

Board Treatment of a Life Science MPF Claim: Reverse Rejection

- The Board concluded:
  - We do not find that the Examiner has provided evidence to support a prima facie case of anticipation or obviousness.
  - **We agree with Appellants that the structures disclosed in the Specification as having the function recited in the claims are limited to (a) the specific antisense oligonucleotides in Example 1, (b) the specific RNAi molecules of Example 5, and (c) equivalents thereof, that are effective in reducing the amount of hsp27 in cancerous cells.**

Board Treatment of a Life Science MPF Claim: Reverse Rejection

- The Board further concluded:
  - We agree with Appellants that, "[t]he Examiner has not presented any evidence to indicate that Sequence ID No.3 of Baracchini is equivalent in function to Sequence ID No. 76 .... [T]he common sequence makes up only 1/3 of Sequence ID No. 76. The Examiner has not provided sufficient evidence that the partial sequence complementarity would necessarily have the same function, as claimed."
  - We agree with Appellants and find that the Examiner has not shown that one of ordinary skill in the art would have, without more, accepted that complementarity of 7 /20 non-consecutive bases would necessarily provide the claimed function of reducing the amount of active hsp27 in cancerous cells. The anticipation rejection is reversed.
  - The obviousness rejection rests on the Examiner's flawed interpretation of Baracchini in the anticipation rejection. Bertrand does not overcome the deficiencies of Baracchini. Therefore, we also reverse the obviousness rejection.

Issued Life Science MPF Claim (Plus Almost 3 Years of PTA Because Appeal Successful!)

(12) **United States Patent**
Gleave et al.

(10) **Patent No.: US 8,722,872 B2**
(45) **Date of Patent: May 13, 2014**

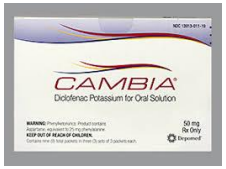
Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 903 days.

Claim 9. A pharmaceutical composition comprising a (a) means for reducing the amount of active hsp27 in cancerous cells and (b) a pharmaceutically acceptable carrier.

Filed June 23, 2009. Expiration date March 24, 2026 (Oct. 2, 2023 + 903 days)

MPF

- *Nautilus Neurosciences, Inc. v. Wockhardt, United States LLC*, 2:11-cv-01997 (D. NJ Feb. 27, 2013) (not for publication)



  - Claim 34 of the '595 patent. A method for obtaining an average T_{max} of diclofenac in a human patient between 5 and 30 minutes after administration comprising orally administering a diclofenac formulation to said patient, wherein said diclofenac formulation comprises diclofenac in acid and/or salt form and means for enhancing said average T_{max} of said diclofenac, and wherein said diclofenac formulation is selected from:
    a) a powder formulation dissolved or dispersed in water; and
    b) a fast release layer present in a two layered diclofenac tablet that comprises a slow release layer and a fast release layer.

Construction of Function

Plaintiff	Defendant	Court
"the use of an agent to shorten the time to maximum plasma concentration of diclofenac in the blood of a human patient"	"lowering the mean time to peak plasma concentration of diclofenac in more than one patient"	"the use of an agent to shorten the time to maximum plasma concentration of diclofenac in the blood of a human patient"

Construction of Corresponding Structure

"alkali metal carbonates or bicarbonates"	Defendant	Court
"alkali metal carbonates or bicarbonates"	"potassium bicarbonate or sodium bicarbonate"	"alkali metal bicarbonates"

Specification Plainly Links or Associates Alkali Metal Bicarbonates (Not Just Potassium or Sodium Bicarbonate) To The Function Recited

- "[I]t has also been found that the combined use of Diclofenac together with alkali metal bicarbonates yields Diclofenac-based pharmaceutical compositions in which the active ingredient is released more rapidly compared with normal formulations, bringing about higher blood levels and therefore a more immediate therapeutic effect . . . .
- As it will be clear from the examples, the immediate release formulations for oral use of the present invention containing from 10 to 60 mg of Diclofenac … together with alkali metal bicarbonates or mixtures thereof … permit to generate in human patients an average C_{max} of Diclofenac comprised between 400 and 2500 ng/ml . . . .
- Secondly, the formulations according to the present invention permit to obtain in humans an average T_{max} of Diclofenac after 5/30 minutes since administration . . . ."

But NOT Alkali Metal Carbonates

- Alkali metal carbonates only disclosed in Examples 1-3 and only in combination with alkali metal bicarbonates.

- *Case settled July 3, 2013.*

Linking Example

Claim limitation	Specification
"means for making said formulation stable at 24 months when stored at room temperature"	"there . . . exists a need for an appropriate range of concentrations for both the 5-HT_3 receptor antagonist and its pharmaceutically acceptable carriers that would facilitate making a formulation with . . . increased stability."
	"[t]he inventors have . . . discovered that by adjusting the formulation's pH and/or excipient concentrations it is possible to increase the stability of palonosetron formulations."
	Specification gives exemplary embodiments that demonstrate what means (i.e., structure and/or materials and/or acts) could be used to increase the stability of palonosetron formulations

Linking Example

Claim No.	Recited function	Exemplified structures and/or materials and/or acts disclosed in the Specification of the application filed herewith
Claim 10	"means for making said formulation stable at 24 months when stored at room temperature"	Page 9, lines 7-9; and Example 4 (page 14)
Claim 11	"means for making said formulation stable at 18 months when stored at room temperature"	Page 9, lines 7-9; and Example 4 (page 14)

Examiner Guidelines

- A claim limitation should be interpreted according to §112(f) if it meets the following **3-prong analysis** (M.P.E.P. § 2181(I)):

A. the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

B. the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

C. the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

§ 112(a) and (b) Also Apply

From M.P.E.P. § 2181(IV):

- An inadequate disclosure may give rise to both an indefiniteness rejection for a means-plus-function limitation and a failure to satisfy the written description and enablement requirements.
  - Federal Circuit: "The problem is especially acute with genus claims that use functional language to define the boundaries of a claimed genus. In such a case, the functional claim may simply claim a desired result, and may do so without describing species that achieve that result. But the specification must demonstrate that the applicant has made a generic invention that achieves the claimed result and do so by showing that the applicant has invented species sufficient to support a claim to the functionally-defined genus." *Ariad Pharmaceuticals Inc. v. Eli & Lilly Co.*, 598 F.3d 1336, 1349, 94 USPQ2d 1161, 1171 (Fed. Cir. 2010) *(en banc)*.

§ 112(a) and (b) Also Apply

35 U.S.C. § 112(b)

- "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."
- M.P.E.P. § 2181(II): For a means plus function limitation in a claim, the applicant must set forth in the specification an adequate disclosure showing what is meant by that language. If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required.

Functional Claim Limitations

Functional limitations

- *A claim term is functional when it recites a feature "by what it does rather than by what it is"* (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. In fact, 35 U.S.C. 112(f) and pre-AIA 35 U.S.C. 112, sixth paragraph, expressly authorize a form of functional claiming (means- (or step-) plus- function claim limitations discussed in MPEP § 2181 *et seq.).*

M.P.E.P. § 2173.05(g) (citations omitted).

Functional Claim Limitations

It may be difficult to anticipate whether a functional recitation will be later interpreted to invoke §112(f).

- Reasons for allowance
- Reexamination / reissue
- Licensing negotiation
- Litigation

Potentially narrowing or invalidating the claims.

- **e.g., under § 112(b) for lack of corresponding structure.**

Practical Tips in Drafting

- No need to avoid functional claiming. Functional claiming allows the drafter to control the scope of the claim (through the specification).
  - Functional claiming allows the prosecutor to maintain some degree of equivalents for elements amended for reasons of patentability.
- Write specification to provide structure that is **clearly linked** to any functional recitations in the claims.
  - Use the claim terms in the specification.
- Disclose as many embodiments, variants and equivalents as possible for the invention.
- Consider explicit “means” claim set
  - By claim differentiation, non-"means" claims may not invoke the statutory construction.
- Include structure in claim (if you do not intend §112(f) treatment).

Practical Tips in Prosecution

- Address Examiner's application of §112(f)
  - Argue/amend; *or*
  - Leave claims as-is and add new non-"means" claims
  - If defending a nonce word, argue that the claim describes how the element is functionally interconnected with other elements

- Approaches to consider
  - Supplement the "intrinsic" record
    - expert statements
    - argument
  - Distinguish various claim sets

Practical Tips in General

- Be deliberate in your decision to use functional claiming, particularly means-plus-function.

- Provide structural/systems/process details in specification for functional claim recitations:
  - Alternative embodiments
  - Multiple examples
  - Varying claim strategies

- Be straightforward in building your record to accomplish your client's goals.

What Factors Do Counsel Need To Keep In Mind When Litigating Formulation Claims?

- What distinguishes the claimed formulation from those of the prior art?
  - How important are secondary considerations?
- Do the asserted claims vary in scope?
  - Consider reducing the number of asserted claims at an appropriate time, based on an assessment of infringement and validity positions.
- Balance a showing of unpredictability for nonobviousness with a showing that the enablement and written description requirements are met.

THANK YOU!

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