

**NEW RULES, DIFFERENT RISK: THE CHANGING FREEDOM TO
OPERATE ANALYSIS FOR BIOTECHNOLOGY**

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Patent protection has evolved since the inception of the Federal Circuit in 1982. Mandated to unify the fractured application of the patent laws, the Federal Circuit initially set out to reinforce the protections guaranteed to patented inventions. For the first couple of decades the Federal Circuit succeeded in strengthening the patent system. Recently however there has been a definite shift in this trend with efforts by the Supreme Court, Federal Circuit, and Congress to both raise the bars to patentability and limit some of the earlier protections granted, particularly to biotechnology patents. Patents are now more likely to be invalidated under the new stricter patenting standards, and the narrower patents that will survive these new standards will have less enforcement capabilities owing to the weakening of many of the patent remedies available to patentees. Overall, these efforts will change the freedom-to-operate calculus of both patentees and putative infringers. This Article reviews these recent changes.

I. INTRODUCTION

The past couple of years have brought substantial innovations and changes in genomic science and the relevant patent laws. Combined, these shifts will globally change the risk analysis of those in the biotechnology space, and particularly those in genomic based therapeutics and diagnostics.

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This Article, in particular, outlines how recent Federal Circuit and Supreme Court rulings transform the freedom to operate analysis, i.e., the ease in which parties can develop innovation without the fear of infringing prior art, and its corollary—the ability to defend in-house intellectual property from outside threats. Overall, as this paper will elucidate, these legal changes are trending towards narrowing biotechnology patents and weakening their enforcement.

Altering the application of the patent statutes as they relate to the life sciences is not a new tactic for the Federal Circuit.¹ In fact, courts often manipulate the various bars to patentability, using them as policy levers to optimize the level of protection that they see fit to offer a particular industry sector,² discriminately applying the patent statute that by design does not discriminate based on the patentable subject matter.

The practice of intellectual property law is malleable, and attorneys should be able to adapt to this new reality provided that they have an understanding of the current state of affairs vis-à-vis biotechnology patents. Hopefully, the knowledge of this global shift will inform all parties as to how to optimally develop, prosecute, and protect biotechnology intellectual property.

II. GENOMIC INNOVATIONS AND PATENTABLE SUBJECT MATTER

Like subject matter jurisdiction, patentable subject matter—a question of law—is a threshold criterion, even when not raised below, making the use of this policy lever all the more powerful in controlling patentability in the field of biotechnology.³

¹ See, e.g., Dov Greenbaum, *An Analysis of the Evolution of the Written Description Requirement vis-à-vis DNA and Biotechnological Inventions*, 1 RECENT PATENTS ON DNA & GENE SEQUENCES 138 (2007).

² See, e.g., Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575 (2003).

³ *In re Comiskey*, No. 2006-1286, 2009 U.S. App. LEXIS 400, at *9-10 (Fed. Cir. Jan. 13, 2009).

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A. *Patentable Subject Matter*

Under the current patent doctrine, “anything under the sun made by man” is patentable, but patents are excluded from natural laws, natural phenomena, abstract ideas, and mental processes.⁴ The Supreme Court reiterated this broad stance on patentable subject matter in *J.E.M. Ag Supply*.⁵ In general, this expansive threshold for patentable subject matter has provided the United States Patent office with substantial flexibility. The ability to adapt and change the application of patent laws is essential when applying a non-discriminatory statutory system to new, novel, and varied technologies and industries. To this end, most all technologies fall under the rubric of patentable subject matter. It is then up to courts to discriminately and judiciously apply the various bars to patentability, such as non-obviousness or novelty as policy levers to then deal with the particular innovation before the patent office, thus optimizing the patent system for each industry, technology, and society as a whole.

The courts however have begun to upset this balanced system by working to narrow patentable subject matter.

1. *Business Method Patents*

The Federal Circuit’s decision in *State Street*⁶ initially expanded the Supreme Court’s scope of patentable subject matter by allowing business method patents when those innovations “produce[] ‘a useful, concrete and tangible result’ ”⁷ In *State Street*, Signature Financial Group patented a data processing system for a hub and spoke model of financial services.⁸ Typically, such a system, although avoiding regulations against

⁴ *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 82-1979, at 5 (1952); H.R. Rep. No. 82-1923, at 6 (1952)).

⁵ *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.*, 534 U.S. 124, 149 (2001) (emphasizing once again the expansive ‘product of man’ requirement for patentable subject matter).

⁶ *State St. Bank & Trust Co. v. Signature Fin. Group*, 149 F.3d 1368 (Fed. Cir. 1998) (en banc).

⁷ *Id.* at 1373 (quoting *In Re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994)).

⁸ U.S. Patent No. 5,193,056 (filed Mar. 11, 1991).

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commingling of disparate mutual fund assets and also allowing for tax advantages, nevertheless results in "great administrative challenges."⁹ Instead, Signature's patent provided a data monitoring, processing, and allocation system for maintaining the financial portfolio.¹⁰ This patent was found to survive the transformation of data threshold and was therefore found to be patentable.¹¹

Subsequently, many processes and methods, including methods for correlating genetic information with disease states or drug metabolism, became patentable subject matter when they were shown to produce a "useful, concrete, and tangible result."¹²

2. Lab Corp: *The Beginning of the End?*

Notwithstanding the decades of general expansion, exemplified by the introduction of business method patents, there have been a number of recent cases that attempt to refine and narrow patentable subject matter.

Justice Breyer's dissent in the Supreme Court's pithy reversal of certiorari in *Lab Corp* arguably set off this recent focus on patentable subject matter.¹³ *Lab Corp*, which raised the issue of patentable subject matter *de novo* and generated twenty amicus briefs on the topic, involved a process patent for helping to diagnose vitamin deficiency through correlating the patient's homocysteine level with the deficiency.¹⁴

Justice Breyer, with *State Street* (and the perceived rampant patenting of business method patents that followed) in his sights, noted the strong policy reasons for limiting these types of process patents, as they "threaten[] to leave the medical profession subject

⁹ *Id.* at col.2 l.67 to .68.

¹⁰ *See id.* at [57].

¹¹ *State St. Bank & Trust Co.*, 149 F.3d at 1377.

¹² *See, e.g., AT&T Corp. v. Excel Commc'ns. Inc.*, 172 F.3d 1352, 1358 (Fed. Cir. 1999) (a physical transformation was not required to create patentable subject matter); *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994).

¹³ *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 125 (2006) (per curiam) (Breyer, J., dissenting).

¹⁴ U.S. Patent No. 4,940,658 (filed July 10, 1990).

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to the restrictions . . . [that] may force doctors to spend unnecessary time and energy to enter into license agreements . . . [that] may raise the cost of health care while inhibiting its effective delivery.”¹⁵

These timely policy concerns may—unlikely as it is for the Supreme Court to go beyond the facts of the case before it—provide an opportunity to deliver a broader *Bilski*¹⁶ ruling that might substantially affect therapeutic and diagnostic biotechnology patents.

3. *Bilski: A New Test for Patentable Subject Matter*

Although Breyer’s dissent in *State Street* is not law, the Federal Circuit’s *Bilski* decision currently is.¹⁷ *Bilski* may have effectively accomplished what Justice Breyer set out to do. In *CyberSource Corp. v. Retail Decisions, Inc.*,¹⁸ the court reasoned that, “without expressly overruling *State Street*, the *Bilski* majority struck down its underpinnings”¹⁹

In *Bilski*, the patentee’s process patent on a method of arbitrage was found to fall outside of the realm of patentable subject matter. In outlining the boundaries of 35 U.S.C. § 101 (the subject matter clause of the patent act),²⁰ the *en banc* court ruled that a patentable method claim must be either tied to a particular machine, or must transform an article.²¹ Further, the use of a specific machine and/or the transformation of an article must impose meaningful limits on the claim’s scope to impart patent-eligibility; i.e., involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity.²²

¹⁵ *Lab. Corp. of Am. Holdings*, 548 U.S. at 138.

¹⁶ *In re Bilski*, 545 F.3d 943 (Fed. Circ. 2008) (en banc), cert. granted sub nom. *Bilski v. Doll*, 129 S. Ct. 2735 (2009).

¹⁷ *Id.*

¹⁸ 620 F. Supp.2d 1068 (N.D. Cal. 2009).

¹⁹ *Id.* at 1080.

²⁰ *Bilski*, 545 F.3d at 949.

²¹ *Id.* at 996.

²² *Id.* at 962–63.

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The prior tests from *In re Alappat*,²³ *State Street* and *AT&T*²⁴ require only a useful, concrete, and tangible result and are now too vague in the eyes of the Federal Circuit, and potentially too broad according to the court's understanding of patentable subject matter.²⁵

Overall, the *Bilski* decision has created substantial uncertainty and concern within many industries, including the diagnostic and therapeutic industry.²⁶ It is hoped that the Supreme Court, in granting *certiorari*, can reinstate some certainty and create law that is supportive of the current direction of biotechnology in general, and therapeutics and diagnostics in particular.

To this end, amici have generated over forty briefs including many from the diagnostics and therapeutics industry.²⁷ In suggesting that the Federal Circuit misquotes and misunderstands the Supreme Court precedent, many amici—noting the importance and centrality of *Bilski*-like tests for the pharmaceutical industry—suggest that the Court create a broader rule that will acknowledge the practical application of scientific principles represented in most

²³ *In re Alappat*, 33 F.3d 1526, 1545 (Fed. Cir. 1994) (software methods are patentable subject matter when tied to a general purpose computer).

²⁴ *State St. Bank & Trust Co. v. Signature Fin. Corp.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998) (“Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.” (quoting *Alappat*, 33 F.3d at 1544)).

²⁵ See *Bilski*, 545 F.3d at 943.

²⁶ See, e.g., Matthew Herder, *Article: Patents & the Progress of Personalized Medicine: Biomarkers Research as Lens*, 18 ANN. HEALTH L. 187, 205 (2009).

²⁷ See, e.g., Amicus Curiae Brief in Support of the Respondent, Submitted on Behalf of Adamas Pharmaceuticals, Inc. and Tethys Bioscience, Inc., *Bilski v. Kappos*, No. 08-964 (U.S. Oct. 2, 2009), available at http://www.abanet.org/publiced/preview/briefs/pdfs/09-10/08-964_Respondent_AmCu2PharmCos.pdf.

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diagnostic patents and allow for a broad reading of § 101, maintaining only the very narrow historical exceptions.²⁸

Until *Bilski* is decided, however, the Federal Circuit, district courts, and the U.S. Patent and Trademark Office (ninety-two percent affirmation rate by the Board of Patent Appeals and Interferences of § 101 rejections) continue to apply the *Bilski* machine or transformation test.²⁹

Recently, in applying the new *Bilski* test, the Federal Circuit tersely affirmed the district court's decision in *Classen Immunotherapies, Inc. v. Biogen IDEC*.³⁰ Channeling *Diamond v. Diehr*,³¹ the court found Classen's patented methods for evaluating and improving the safety of immunization schedules through examining the correlation between vaccination schedules and the risk of developing chronic immune mediated disorders to be simply a discovery of natural phenomenon and unpatentable. The correlation process described and patented was found to be indistinguishable from the idea itself.³²

Personalized medicine is the next generation in diagnostics and therapeutics and will transform the way healthcare is delivered.

²⁸ See generally amici at http://www.scotuswiki.com/index.php?title=Bilski_v._Doll.

²⁹ See, e.g., *In re Ferguson*, 558 F.3d 1359, 1362 (Fed. Cir. 2009) (seemingly superfluously invalidated claims under § 101 even though examiner limited invalidity to issues unrelated to § 101); *King Pharm., Inc. v. Eon Labs., Inc.*, 593 F. Supp.2d 501 (E.D. N.Y. 2009) (summary judgment of invalidity against a patentee claiming methods for informing patients about and administering a particular muscle relaxant for preemption and lack of transformation concerns).

³⁰ 304 Fed. Appx. 866 (Fed. Cir. 2008), *reh'g en banc denied*, 2009 U.S. App. LEXIS 24202 (Fed. Cir. Feb. 9, 2009). The opinion in its entirety:

In light of our decision in *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc), we affirm the district court's grant of summary judgment that these claims are invalid under 35 U.S.C. § 101. Dr. Classen's claims are neither 'tied to a particular machine or apparatus' nor do they 'transform[] a particular article into a different state or thing.' *Bilski*, 545 F.3d at 954. Therefore we affirm.

Id.

³¹ 450 U.S. 175, 184 (1981) (patentability for a process to cure synthetic rubber required tying to a machine or a transformation).

³² *Classen*, 304 Fed. Appx. at 867.

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Typically the term refers to a method whereby a therapeutic product or service is prescribed and/or titrated (or potentially even developed) to a particular patient subset as determined by the molecular features—genetic make-up, gene, or protein expression pattern—of the individual.

Currently, most drugs are selected or dosed based on the patient's age, weight, and presence or absence of various comorbid conditions or disease. These relatively gross levels of distinction unfortunately fail to take into account many highly relevant biological features specific to the individual patient, such as individual patient pharmacokinetics, including the absorption, distribution, metabolism, and excretion of drugs that affect the drug's safety and effectiveness in each unique individual.

Key components of the personalized medicine revolution are the genetic/biochemical assays, biomarkers, and diagnostic tests that can be used to stratify the patient population and establish optimal usage of a particular drug.³³ The tests often rely upon knowledge of a specific gene and its disease-related mutations and the correlations between the different mutations and disease phenotype.³⁴ Patents in this context may protect the sequence of the gene and its mutations, the correlations between the genetic mutations or alleles with the disease or drug metabolism, the methods for treating the disease or delivering the drug based on this knowledge, or any combination of these innovations.

Genetic diagnostic technologies are unusual within the context of intellectual property in that, unlike other fields, it may be difficult to invent around the patented gene-drug-disease relationship, leaving the patentee able to control access to that gene's diagnostic powers. Without the protection of intellectual property rights, there are concerns that, among other

³³ Sheila Walcoff & Dov Greenbaum, *Whose Gene Is it Anyway? Patenting Personalised Medicine*, INT'L NEWS (McDermott Will & Emery, London, Eng.), Issue 2, 2009, at 16, available at <http://www.mwe.com/info/news/int-summer09.pdf>.

³⁴ *Id.*

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impediments to research, valuable venture capital funding will dry up and effectively impede innovation in these fields.

Prometheus is the exclusive licensee of a couple of patents that claim a process of measuring metabolized azathioprine and other thiopurine drugs to determine an optimal patient dosage.³⁵ The Court of Appeals for the Federal Circuit reversed the district court ruling that struck down a method claim for “optimizing therapeutic efficacy for treatment of an immune-mediated gastrointestinal disorder.”³⁶ That method involved several steps: 1) administering synthetic thiopurine drugs to a patient, 2) determining the levels of certain metabolites from a bodily sample, such as blood, and 3) adjusting the dosage up or down based on the metabolite levels.³⁷

In applying *Bilski*, the court found that the method of treatment was an application of a natural process by way of a series of transformative steps of both the pro-drug and the body; the court noted that tying the correlative step to a therapeutic treatment protocol made steps (1) and (2) not insignificant under *Bilski* and, as such, patentable subject matter.³⁸

The *Prometheus* decision points to a potential work-around for genomic diagnostics fearful of losing protection: tying the claims to an actual method of treatment.³⁹ *Prometheus* shows that the courts will acknowledge drug metabolism that occurs naturally in the body as transformative events within the *Bilski* model.⁴⁰

Notwithstanding Prometheus’s win (at this point certiorari has not been granted to overturn the ruling), in the words of the dissenting opinion of Judge Rader, *Bilski* may prove to have a substantial negative impact on biotechnology research and development as it “inadvertently advises investors that they should

³⁵ *Prometheus Labs., Inc. v. Mayo Collaborative Servs.*, 581 F.3d 1336, 1339 (Fed. Cir. 2009).

³⁶ *Id.* at 1340.

³⁷ *Id.*

³⁸ *Id.* at 1349–50.

³⁹ *See id.* at 1347–50.

⁴⁰ *Id.* at 1349.

divert their unprotectable investments away from discovery of ‘scientific relationships’ within the body that diagnose breast cancer or Lou Gehrig’s disease or Parkinson’s or whatever.’⁴¹

Perhaps the most disconcerting of all the cases currently attempting to narrow patentable subject matter is the *Myriad* case in the Southern District of New York.⁴² The American Civil Liberties Union (“ACLU”), in conjunction with numerous research associations and other empathetic parties, filed a lawsuit against Myriad Genetics of Utah arguing that Myriad’s intellectual property control over the BRCA genes for predicting genetic predispositions to breast and ovarian cancer violates both the Constitution and the Patent Act.⁴³ Myriad’s patents claim the gene coding for the BRCA2 peptide, methods for detecting mutations in the BRCA gene, and methods for detecting changes in the BRCA gene.⁴⁴

In particular, the ACLU argues that both the genes and asserted correlations exist in nature and should be outside the scope of patentable subject matter.⁴⁵ The ACLU further argues that the USPTO’s position on gene patents—in that purified genes do not exist in nature and as such are patentable—supported by nearly a century of case law⁴⁶—violates the Constitution; as a First Amendment issue, patenting genes also undermines the free flow of information and scientific information,⁴⁷ notwithstanding evidence to the contrary.⁴⁸

⁴¹ *In re Bilski*, 545 F.3d 943, 1014 (Fed. Cir. 2008) (Rader, J., dissenting).

⁴² *Ass’n for Molecular Pathology v. U.S. Patent and Trademark Office*, No. 09 Civ4515, 2009 U.S. Dist. LEXIS 101809 (S.D.N.Y. Nov. 1, 2009).

⁴³ *Id.*

⁴⁴ *Id.* at *2.

⁴⁵ *Id.* at *40 n.7.

⁴⁶ *See, e.g., Parke-Davis & Co. v. H. K. Mulford & Co.*, 196 F. 496 (2d Cir. 1912) (allowing for the patentability of purified adrenaline).

⁴⁷ *Id.*

⁴⁸ *See, e.g., AM. ASS’N FOR THE ADVANCEMENT OF SCI., SCI. & INTELLECTUAL PROP. IN THE PUB. INTEREST, EFFECTS OF INTELLECTUAL PROPERTY PROTECTIONS ON THE CONDUCT OF SCIENTIFIC RESEARCH: RESULTS OF A SURVEY OF U.S. AAAS MEMBERS (2007)* http://sippi.aaas.org/Symposium_US/

III. OTHER HURDLES TO PATENTING BIOTECHNOLOGY

Subject matter is only one of the bars to patentability, and the therapeutics and diagnostics industry is currently under siege from other parts of the Patent Act as well, including 35 U.S.C. § 102 (novelty), § 103 (non-obviousness),⁴⁹ and the § 112 written description requirement.⁵⁰

If *Bilski* potentially prevents the patenting of a procedure to find actionable genomic correlations, *Kubin*⁵¹ and *Gleave*⁵² may further limit the patentability of the underlying genes that are being correlated.

A. Kubin: *Non-Obviousness*

Many have viewed the Federal Circuit's *Kubin* decision⁵³ as a significant change in the law of obviousness regarding biotechnology. *Kubin*'s patent application dealt with "the isolation and sequencing of a human gene" that encoded a known protein.⁵⁴ The Board of Patent Appeals and Interferences had rejected the application as obvious⁵⁵ under the new *KSR* standard,⁵⁶ as one skilled in the art would be motivated to use conventional methodologies to isolate the gene. The public owns the innovation, but the inventor of the prior art that served to obviate the claims in *Kubin* does not.

In upholding the Board's decision—which found that the determination of the protein's gene was routine—the Federal Circuit focused on the methodology of acquiring the claimed

Symposium_Brief.pdf (last visited Apr. 15, 2010) (on file with the North Carolina Journal of Law & Technology).

⁴⁹ 35 U.S.C. § 103(a) (2006).

⁵⁰ 35 U.S.C. § 112 (2006).

⁵¹ See *infra* Part III.A.

⁵² See *infra* Part III.B.

⁵³ *In re Kubin*, 561 F.3d 1351 (Fed. Cir. 2009).

⁵⁴ U.S. Patent Application Serial No. 09/667,859.

⁵⁵ *Ex parte Kubin*, 83 U.S.P.Q.2d 1410 (B.P.A.I. May 31, 2007).

⁵⁶ *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007) (finding that 35 U.S.C. § 103 (2006) bars patentability unless the improvement is more than the predictable use of prior art elements according to their established functions).

compound and not on the novelty of the compound itself, finding that the determination of the gene was obvious to try as per *KSR*'s standards.⁵⁷ *Kubin* effectively overruled the Federal Circuit's 1995 *In re Deuel* decision⁵⁸ and broadened *KSR* to include the unpredictable art of biotechnology. Fortunately though, *Kubin*'s facts were particularly detrimental for the applicant in that case, making it easy to distinguish most cases from the ruling in *Kubin*, and hopefully leaving at least as many gene patents as still non-obvious.

The Federal Circuit put further constraints on patentability of biotechnological innovations in *In re Gleave*.⁵⁹

B. *Gleave: Novelty/Anticipation*

Decided only days apart from *Kubin*, *Gleave* stands for the proposition that anticipation of an oligonucleotide, i.e. a short DNA or RNA molecule, merely requires that said nucleotide sequence exist in the prior art—even without any disclosed usefulness.⁶⁰ The Board and subsequently the district court found *Gleave*'s innovation, antisense oligonucleotides (i.e., a single stand of nucleotides that are complimentary to the sequence in the genome) designed to specifically bind to insulin dependent growth factor proteins, to be anticipated by a prior art listing of every possible iteration of fifteen base-pair oligonucleotide string in the Insulin-Dependent Growth Factor Binding Protein (“IGFBP”) gene, albeit without any disclosure of any functional information or the antisense sequence.⁶¹ The Federal Circuit affirmed.⁶² Citing

⁵⁷ *Kubin*, 561 F.3d at 1358–61.

⁵⁸ *In re Deuel*, 51 F.3d 1552, 1559 (Fed. Cir. 1995) (reaffirming that “the existence of a general method of isolating cDNA or DNA molecules is essentially irrelevant to the question whether the specific molecules themselves would have been obvious, in the absence of other prior art that suggests the claimed DNAs”).

⁵⁹ *In re Gleave*, 560 F.3d 1331 (Fed. Cir. 2009).

⁶⁰ *Id.* at 1336.

⁶¹ *Id.* at 1337–38.

⁶² *Id.* at 1338.

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Impax Lab., Inc. v. Aventis Pharm., Inc.,⁶³ the court suggested that all that is necessary is that the prior art enable one skilled in the art to make the innovation, not actually use it.⁶⁴

Thus, although the sequences in the prior art could not be enabled without any usefulness characterization, the same sequences could be anticipated. Although the court did leave open the possibility of patenting a method of use for Gleave's antisense sequences,⁶⁵ with the human genome fully sequenced and new genomes coming online daily, gene sequence composition patents could quickly become a thing of the past.

C. Ariad: *Written Description Requirement*⁶⁶

Although biotechnology has had a relatively heightened written description requirement compared to other technologies, this requirement has been pretty consistent and reliable since the Federal Circuit's 1997 decision in *Eli Lilly*,⁶⁷ wherein Judge Lourie set out his bright line rule requiring a "precise definition . . . by structure, formula, chemical name, or physical properties" separate and distinct from 35 U.S.C. § 112's relatively weaker enablement requirement.⁶⁸

In general, the written description requirement is designed to show the inventor's possession of the invention as of the filing date of the patent.⁶⁹ As applied to genetic innovations, the written description requirement requires a listing of the precise gene sequence of a claimed gene in a composition patent or the

⁶³ 545 F.3d 1312, 1314 (Fed. Cir. 2008); *cf.* *Bristol-Myers Squibb Co. v. Ben Venue Lab., Inc.*, 246 F.3d 1368, 1374 (Fed. Cir. 2001) ("[T]o anticipate, the reference must also enable one of skill in the art to make and use the claimed invention.").

⁶⁴ *Gleave*, 560 F.3d at 1334.

⁶⁵ *Id.* at 1338.

⁶⁶ *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 560 F.3d 1366 (Fed. Cir. 2009), *vacated*, 332 Fed. Appx. 636, 2009 U.S. App. LEXIS 18981 (Fed. Cir. 2009).

⁶⁷ *Regents of Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559 (Fed. Cir. 1997).

⁶⁸ *Id.* at 1566–67.

⁶⁹ *See, e.g., Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1374 (Fed. Cir. 2009).

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composition of that gene in a method patent.⁷⁰ Disclosure of how to acquire that gene is not sufficient.⁷¹

The written description requirement as currently applied to biotechnology also makes it difficult to sufficiently describe a subset of species to claim the entire genus. Most recently in *Carnegie Mellon University*,⁷² and subsequently in *In re Alonso*,⁷³ the Federal Circuit emphasized a per se, formulistic approach to the written description requirement in biotechnological arts, requiring the recitation of all the known sequences in order to afford protection for the entire genus.⁷⁴

Whereas the enablement requirement requires only that the patent shows how one of ordinary skill in the art could go about acquiring the sequence, as it stands, the high bar set for a biotechnology written description makes it easier to invalidate patents on summary judgment.

Until now, the alternative for biotechnology inventors was to narrow their claims to a subset of a genus, something often easy to design around and hard to protect. The Federal Circuit in its upcoming *en banc* review of its April *Ariad* decision, which invalidated *Ariad*'s patent for failing to adequately disclose the sequences of the molecules that inhibited NF-KB activity, the claimed invention,⁷⁵ will examine whether the statute supports both a written description and enablement requirement, potentially substantially changing how gene patents are prosecuted and litigated.

⁷⁰ See *Invitrogen Corp. v. Clontech Labs., Inc.*, 429 F.3d 1052, 1073–74 (Fed. Cir. 2005).

⁷¹ See *id.* at 1073.

⁷² *Carnegie Mellon Univ. v. Hoffman-La Roche*, 541 F.3d 1115 (Fed. Cir. 2008).

⁷³ *In re Alonso*, 545 F.3d 1015 (Fed. Cir. 2008)

⁷⁴ *Id.* at 1019–21.

⁷⁵ *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 560 F.3d 1366 (Fed. Cir. 2009), *vacated*, 332 Fed. Appx. 636, 2009 U.S. App. LEXIS 18981 (Fed. Cir. 2009).

**IV. CHANGING THE IMPLEMENTATION OF PATENT REMEDIES
FURTHER WEAKEN PATENTS**

Patent remedies are an integral component of the patentee's social contract, providing teeth to the patentee's right to exclude.⁷⁶ The strength of the remedies provided to the patentee will likely factor into any freedom to operate analysis. Thus, the greater the threat, the less likely another party will infringe. Further, the strength of the remedy will likely be inversely proportional to the risk a party is willing to take to compete in the same space as the patentee—if a patentee can reliably threaten to enjoin the other party from using or developing innovations similar to the protected technology, that party may be less likely to perceive that they have freedom to operate in the space. But, as this part will show, patent remedies have lost much of their bite and possibly their ability to deter infringement—weakening the underlying patents.

Simplistically, all remedies can be distinguished by their temporal goals: restitutionary damages for past infringing actions expectantly equal in amount to the patentee's injury, and equitable remedies to prevent or compensate for future infringement.

A. Injunctions

In *eBay*,⁷⁷ the Supreme Court unanimously overruled the Federal Circuit's application of its exceptional circumstance rule, heretofore used somewhat unsparingly to grant injunctive relief to patent holders, in favor of a rule more in line with traditional notions and principles of equity.⁷⁸

In rejecting the formerly relatively routine practice of awarding permanent injunctions, barring exceptional circumstance to prevailing patentees, *eBay* set forth a test that has led to injunctions being denied by the district courts in approximately a quarter of all patent cases.

⁷⁶ See 35 U.S.C. § 281 (2006).

⁷⁷ *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006) (vacating a Federal Circuit damages ruling for infringement of a business method patent).

⁷⁸ *Id.* at 392–93.

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The new test requires a plaintiff to demonstrate several things. First, the plaintiff must show that he has suffered an irreparable injury. Courts have looked at past harms to the patentee's market share, revenues, and brand recognition as relevant for determining whether the patentee has suffered an irreparable injury.⁷⁹ However, “lost sales standing alone are insufficient to prove irreparable harm.”⁸⁰ Because harm is often the result of consumer confusion, harm to the brand is overwhelmingly limited to infringement by direct competitors.⁸¹

Second, the plaintiff must show that remedies available at law are inadequate to compensate him for his injury.⁸² Courts have found the difficulty in calculating damages accurately,⁸³ and an infringer’s inability to pay damages, to be an important issue in determining this factor.⁸⁴

Third, a plaintiff must show that the balance of hardships between him and the defendant favors the plaintiff. The “‘balance of hardships’ assesses the relative effect of granting or denying an injunction on the parties These factors include[] the parties’ sizes, products, and revenue sources.”⁸⁵ In fleshing out this factor, district courts applying *eBay* have also generally looked to the

⁷⁹ *I4I L.P. v. Microsoft Corp.*, 589 F.3d 1246 (Fed. Cir. 2009), *replaced by* 2010 U.S. App. LEXIS 5010 (Fed. Cir. Mar. 10, 2010).

⁸⁰ *Automated Merch. Sys. v. Crane Co.*, No. 2009-1054, 2009 U.S. App. LEXIS 27667, at *8 (Fed. Cir. Dec. 16, 2009).

⁸¹ *See, e.g., z4 Techs. Inc. v. Microsoft Corp.*, 434 F. Supp. 2d 437, 440–41 (E.D. Tex. 2006), *cert. denied*, 128 S. Ct. 2107 (2008).

⁸² *eBay*, 547 U.S. at 391.

⁸³ *See Cummins-Allison Corp. v. SBM Co.*, No. 9:07CV196, 2009 U.S. Dist. LEXIS 106093, at *14 (E.D. Tex. Nov. 13, 2009) (citing *Ross-Simons of Warwick, Inc. v. Baccarat, Inc.*, 102 F.3d 12, 19 (1st Cir. 1996)).

⁸⁴ *See Apple Inc. v. Psystar Corp.*, No. C 08-03251 WHA, 2009 U.S. Dist. LEXIS 116502, at *12 (N.D. Cal. Dec. 15, 2009).

⁸⁵ *I4I L.P. v. Microsoft Corp.*, 589 F.3d 1246, 1277 (Fed. Cir. 2009) (quoting *eBay*, 547 U.S. at 391)

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parties' competitive relationship,⁸⁶ the nature of the relevant market,⁸⁷ and patentee's prior licensing history.⁸⁸

Finally, a plaintiff must show "that the public interest would not be disserved by a permanent injunction."⁸⁹ In areas of medical technology, courts have often been persuaded to deny injunctive relief particularly when the public's health and safety is potentially at risk.⁹⁰

B. *Royalties*

Notwithstanding *eBay* and its progeny's efforts to curb injunctive remedies, the courts retain other recourses in prospective remedies to make patentees whole while still protecting the public interest. Ordered royalties in particular are an effective remedy that can be wielded by the court. Essentially a court-ordered compulsory license, ordered royalties provide restitution for the injured patentee while simultaneously providing for the public interest in allowing for the compensated usage of the patented technologies. Further, it provides additional incentives for the court not to enjoin the infringing activity, further bolstering the *eBay* trend.

In *Paice*,⁹¹ while applying *eBay*'s four-factor test, the Federal Circuit settled on an ongoing royalty in lieu of injunctive relief.⁹²

⁸⁶ See, e.g., *Hynix Semiconductor Inc. v. Rambus Inc.*, 609 F. Supp. 2d 951, 968 (N.D. Cal. 2009).

⁸⁷ See, e.g., *Advanced Cardiovascular Sys. v. Medtronic Vascular, Inc.*, 579 F. Supp. 2d 554, 559–560 (D. Del. 2008).

⁸⁸ See, e.g., *IMX, Inc. v. Lendingtree, LLC*, 469 F. Supp. 2d 203, 225 (D. Del. 2007).

⁸⁹ *eBay*, 547 U.S. at 391.

⁹⁰ See *Kimberly-Clark Worldwide, Inc. v. Tyco Healthcare Group LP*, 635 F. Supp. 2d 870, 882 (E.D. Wis. 2009) (noting that "[a]n injunction would mean that some nontrivial number of patients would not be able to receive the treatment their physician preferred"); *Advanced Cardiovascular*, 579 F. Supp. 2d at 561 (citing precedent finding public harm for injunctions against physician-preferred medical devices).

⁹¹ *Paice LLC v. Toyota Motor Corp.*, 504 F.3d 1293 (Fed. Cir. 2007).

⁹² *Id.* at 1302.

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One of Paice's patented drive trains was found to have been infringed, under the doctrine of equivalents, by Toyota's hybrid vehicle drive trains.⁹³ In finding that monetary compensation was adequate and that no irreparable harm was threatened, the Federal Circuit affirmed the district court's remedy under the statutory language of 35 U.S.C. § 283 for the remaining life of the patent.⁹⁴

C. Restitutionary Damages

A patentee's ability to protect its technological sphere by creating a fear of restitutionary patent damages has also been substantially eroded by recent case law and proposed patent reforms.

Patent damages are designed to be compensatory, not retributive.⁹⁵ To this end, courts preferentially look at actual lost profits in calculating damages.⁹⁶ In the alternative, courts will attempt to establish a reasonable royalty determination for damages, designed to represent the minimum level of loss attributed to the infringing actions of the accused.⁹⁷

Lost profits, typically the greater of the two awards, cannot be granted unless the two parties are in direct competition.⁹⁸ Under this rubric, where the actions of the putative infringer cannot represent lost sales, the offending actions are unlikely to trigger a

⁹³ *Id.* at 1308.

⁹⁴ *Id.* at 1316. The court did, however, remand the case for additional litigation on the specific amount of the royalties. *Id.*

⁹⁵ See *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1223 (Fed. Cir. 1995).

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *BIC Leisure Prods., Inc. v. Windsurfing Int'l, Inc.*, 1 F.3d 1214, 1218 (Fed. Cir. 1993) (discussing application of *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978) ("The *Panduit* test . . . operates under an inherent assumption . . . that the patent owner and the infringer sell products sufficiently similar to compete against each other in the same market segment.")).

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lost profits calculation by the courts in establishing damages.⁹⁹ While past decisions have attempted to bolster damage awards determined by the alternative reasonable royalty analysis, the courts and the legislature have now begun to rein in bloated, supposedly reasonable royalties.¹⁰⁰

To this end, the Federal Circuit has attempted to better concretize the methods for determining the pre-litigation royalty rates and to limit the application of the entire market value rule in determining damages for patent infringement, for example by requiring that the infringing component or product drive customer demand for the entire product.¹⁰¹ The court also effectively raised the standards required by the patentee to prove damages for infringement.¹⁰²

Judge Rader of the Federal Circuit, sitting by designation in the Northern District of New York, recently penned a decision that further cuts back on a patentee's ability to threaten arduous royalty rates.¹⁰³ Judge Rader's decision is a significant dent in the patentee's ability to command substantial royalty rates, as it suggests that the courts will no longer tolerate attempts to show economic entitlement to damages based on technology beyond the scope of the claimed invention.¹⁰⁴

⁹⁹ See, e.g., *Grain Processing Corp. v. American Maize-Products Co.*, 185 F.3d 1341, 1343 (Fed. Cir. 1999).

¹⁰⁰ See, e.g., Mark A. Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655 (2009).

¹⁰¹ See *Lucent Techs. v. Gateway, Inc.*, 580 F.3d 1301, 1337–38 (Fed. Cir. 2009); *American Seating Co. v. USSC Group, Inc.*, 514 F.3d 1262, (Fed. Cir. 2008) (finding entire market value rule inapplicable when infringing product was sold with non-infringing product for convenience only).

¹⁰² *Lucent*, 580 F.3d at 1338.

¹⁰³ *Cornell Univ. v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279 (N.D.N.Y. 2009) (severely curtailing the rewarded royalties via narrowing the royalty analysis to the actual contribution of the infringing component to the demand for the product from which the royalty base is derived).

¹⁰⁴ *Id.*

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D. *Apportionment*

Congress has also worked towards introducing apportionment into the damages calculus. The House Bill, H.R. 1260,¹⁰⁵ amends 35 U.S.C. § 284 to codify judicial methods to calculate the reasonable royalty rate applied in damages calculation by adding in a valuation calculation component to the royalty rate analysis. Introduced in March of 2009, this version of the Patent Reform Act addresses other damages issues as well, including an attempt to rein in enhanced damages awards extracted from willful infringers.¹⁰⁶

Both the House Bill¹⁰⁷ and the Senate Bill, S. 515,¹⁰⁸ provide standards for establishing willfulness. Section 4 of the Senate's Patent Reform Act requires that (1) the patentee serve written notice of the alleged acts that provides "an objectively reasonable apprehension of suit," and (2) that "the infringer intentionally copied the patented invention with knowledge that it was patented."¹⁰⁹ The legislation also provides a statutory good faith defense to willfulness when there is a *bona fide* belief that the patent is not infringed, invalid, or unenforceable.¹¹⁰

This legislation further provides for a codification of the newly restrictive objective recklessness standard for finding willfulness derived from the *Seagate* decision.¹¹¹ The Federal Circuit's decision, overruling a twenty-year standard, has substantially limited the patentee's ability to assert a claim for treble damages for willful infringement, a claim that had become *de rigeur* in nearly every infringement claim, and has discouraged risk-averse parties from conducting research that might approach an area near

¹⁰⁵ Patent Reform Act of 2009, H.R. 1260, 111th Cong. § 5(a) (2009).

¹⁰⁶ *Id.*

¹⁰⁷ *Id.* (amending language of 35 U.S.C. § 284(e)).

¹⁰⁸ Patent Reform Act of 2009, S. 515, 111th Cong. § 4(a) (2009) (amending language of 35 U.S.C. § 284(e)).

¹⁰⁹ *Id.* (addressing language of 35 U.S.C. § 284(c)(2)(B)).

¹¹⁰ *Id.* (addressing language of 35 U.S.C. § 284(c)(3)).

¹¹¹ *In re Seagate Tech., LLC*, 497 F.3d 1360 (Fed. Cir. 2007) (en banc).

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patented technologies.¹¹² Under the new standard, the patentee “must show by clear and convincing evidence that the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent,” and that the “objectively-defined risk was either known or so obvious that it should have been known to the accused infringer.”¹¹³

E. *Antitrust*

Finally, a recent publication by the Federal Trade Commission and the Department of Justice reconciled antitrust and intellectual property law as “complementary bodies of law that work together to bring innovation to consumers”¹¹⁴ Nevertheless, anti-competitive enforcement of intellectual property rights can run afoul of antitrust law particularly when those actions extend beyond the statutory patent grant.¹¹⁵ To the extent that a patentee extends control over their patents beyond their statutory term or scope, the court has substantial recourse to apply antitrust laws to prevent such abuse.

VI. CONCLUSION

The freedom to operate analysis is an important component in promoting innovation while securing patent rights for inventors. The analysis establishes whether it is worthwhile to innovate or operate in a particular space, and aims primarily to determine the relative threat of other patentees and their licensees if the party conducting the analysis moves too closely to a protected space.

For much of its history, the Federal Circuit has been expanding the protections granted to biotechnological innovation, both in the wide berth granted to patentees to shore up their innovations, and

¹¹² See Kimberly A. Moore, *Empirical Statistics on Willful Patent Infringement*, 14 FED. CIR. B.J. 227 (2004).

¹¹³ *Seagate*, 497 F.3d at 1371.

¹¹⁴ U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 2 (2007).

¹¹⁵ See *CSU, LLC v. Xerox Corp.*, 203 F.3d 1322, 1325 (Fed. Cir. 2000).

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also in the level of remedies provided to these patentees to protect and defend those patents.

The court now seems to be making a substantial shift in policy by narrowing the patent protections granted to biotechnology and by scaling down the remedies available for infringed patents. Perhaps indicative of the Federal Circuit's position on biotechnology patents, both *Gleave* and *Kubin* stand for the proposition that the public can be in possession of an innovation—anticipating or making a patent non-obvious—but under the same set of facts, the inventor cannot.

Whether or not this shift will be good for the biotechnology industry remains to be seen. Perhaps as the direction of innovation in the industry trends toward new and nascent genomic and synthetic biology technologies, the courts have seen fit to limit the ability of early-comers to shore up large swaths of new innovations, by gaining broad protectable patents—as was the case at the beginning of the biotechnology boom in the late seventies and early eighties. And perhaps, with synthetic biology and nanotechnology poised to become central to the future development of biotechnology, the courts have recognized the many similarities that these technologies share with high-tech and are adjusting the application of the patent statutes to account for the non-biotechnology aspects of these technologies, characteristics that require a different kind of application of the patent statute—similar to the one the courts are currently developing.