Note

Evaluating the *Integrat*y of Biotechnology Research Tools: *Merck v. Integra* and the Scope of 35 U.S.C. § 271(e)(1)

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Patents are a common fixture in technology industries and have pervaded public consciousness to such an extent that even the world of Harry Potter, teenage wizard extraordinaire, has its own patent office.[1] This phenomenon is particularly evident in the biotechnology and pharmaceutical industries, where patents are a necessary part of doing business.[2] However, patents can create problems as well. For example, until the early 1980s, patent laws prevented development of generic versions of patented drug compounds, even if the generic version would not enter the market until after the patent covering the compound expired.[3]

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1. *See* J.K. ROWLING, HARRY POTTER AND THE ORDER OF THE PHOENIX 129 (2003) (describing the "Ludicrous Patents Office" within the "Ministry of Magic").

2. *See* Brief of Amicus Curiae Vaccinex, Inc. in Support of Respondents at 8, Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193 (2005) (No. 03-1237) [hereinafter Vaccinex Amicus Brief] ("Enforceable patents covering research tools are imperative to the existence of small and mid-sized companies in the biotechnology industry . . . ."); Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1589 n.38 (2003) (showing that biotechnology companies spend as much as ten percent of their budget on patent protection).

3. *See, e.g.*, Roche Prods., Inc. v. Bolar Pharm. Co., Inc., 733 F.2d 858, 860–63 (Fed. Cir. 1984) (refusing to allow Bolar's research under the "experimental use" exception to patent infringement, even though the research was solely for the purpose of developing a generic version of Roche's drug to be marketed after Roche's patent expired).

Congress passed the Drug Price Competition and Patent Term Restoration Act of 1984,[4] known as the Hatch-Waxman Act, to address this problem. Among other things, this Act created a new infringement exemption for uses of patented inventions, codified at 35 U.S.C. § 271(e)(1), which exempted acts that would otherwise constitute infringement if they were reasonably related to the development and submission of information to the Food and Drug Administration (FDA).[5]

Section 271(e)(1) started as a straightforward exemption allowing equivalency experiments on drug compounds during generic drug research and development.[6] However, courts interpreting this section have expanded its reach to a wide array of products.[7] Recently, the Supreme Court extended § 271(e)(1) to include activities conducted very early in the drug research cycle by exempting from patent infringement activities directed toward developing *new* drugs.[8] These cases have raised questions as to whether research tools used to identify and develop new pharmaceuticals, often referred to as biotechnology, or biotech, research tools, fall under the § 271(e)(1) exemption.

The Supreme Court's 2005 decision in *Merck KGaA v. Integra Lifesciences I, Ltd.*, in particular, added to the speculation over biotech research tools when it found that exempted uses under § 271(e)(1) include all research in which "there is a reasonable basis for believing that the experiments will produce 'the types of information that are relevant'" to an FDA drug application.[9] Moreover, rather than clarifying its position on research tools and the exemption, the Supreme Court fueled the

4. Pub. L. No. 98-417, 98 Stat. 1585 (1984) (codified as amended in scattered sections of 21 U.S.C. and 35 U.S.C.).

5. *See* 35 U.S.C. § 271(e)(1) (2000) (exempting from infringement acts which are "solely for uses reasonably related to the development and submission of information under a Federal law which regulates the manufacture, use, or sale of drugs").

6. *Cf.* H.R. REP. NO. 98-857, pt. 2, at 29 (1984), *reprinted in* 1984 U.S.C.C.A.N. 2686, 2713 (emphasizing that the new § 271(e)(1) will allow generic drugs "to be placed on the market between 18 months and 2 years earlier").

7. *See, e.g.*, Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661 (1990) (extending § 271(e)(1) to medical devices).

8. Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 208 (2005) (finding that the use of patented compounds in preclinical research falls under § 271(e)(1)).

9. *Id.* (quoting Brief for the United States as Amicus Curiae Supporting Petitioner at 23, *Merck*, 545 U.S. 193 (No. 03-1237)).

debate by declining to discuss research tools.[10] Understandably, this holding has created alarm among research tool patentees who fear their patent rights are under attack.

This Note examines the § 271(e)(1) exemption and analyzes whether biotech research tools qualify for its protection. In particular, this Note focuses on research tools used in the discovery and development of FDA-regulated products. Part I defines biotech research tools and summarizes § 271(e)(1)'s background and the context of its enactment. Part II explores case law construing § 271(e)(1), focusing specifically on the section's application to biotech research tools. Finally, Part III argues that the § 271(e)(1) exemption does not apply to the use of patented research tools. While research tool use is often reasonably related to the submission of information to the FDA, research tools do not fall under the intended definition of "patented invention" used in § 271(e)(1), and courts should not expand the provision to include them. Moreover, it is clear from the legislative history of the Hatch-Waxman Act that Congress meant to limit § 271(e)(1) to products that are themselves subject to FDA regulation, and not to every invention used during drug research.

I. BACKGROUND

A. WHAT ARE BIOTECHNOLOGY RESEARCH TOOLS?

Before determining whether biotechnology research tools may qualify for the § 271(e)(1) exemption, it is necessary to define research tools. The term seems straightforward. After all, many researchers view the resources they use in their laboratory as "tools."[11] Therefore, it seems logical to christen these resources "research tools." The National Institutes of Health proposed just such a definition when it defined biotech research tools to include "the full range of resources that scientists use in the laboratory."[12] This broad definition included "cell lines,

10. *Id.* at 205 n.7 ("[W]e . . . do not . . . express a view about whether, or to what extent, § 271(e)(1) exempts from infringement the use of 'research tools' in the development of information for the regulatory process.").

11. Janice M. Mueller, *No "Dilettante Affair": Rethinking the Experimental Use Exception to Patent Infringement for Biomedical Research Tools*, 76 WASH. L. REV. 1, 10 (2001).

12. NAT'L INSTS. OF HEALTH, REPORT OF THE NATIONAL INSTITUTES OF HEALTH (NIH) WORKING GROUP ON RESEARCH TOOLS (1998), http://www.nih.gov/news/researchtools/ [hereinafter NIH RESEARCH TOOLS REPORT].

monoclonal antibodies, reagents, animal models, growth factors, combinatorial chemistry libraries, drugs and drug targets, clones and cloning tools . . . , methods, laboratory equipment and machines, databases and computer software."[13]

However, a research tool for one company can be a valuable end product for another,[14] and a product that is clearly a research tool today may be a valuable end product tomorrow.[15] Of course, if a company wishes to use a particular tool as an end product that is subject to FDA regulation, then the tool will fall directly under the § 271(e)(1) exemption.[16]

As it is normally used, the term "research tool" implies that a firm uses the tool for research, but the tool itself is not part of the end product resulting from the research. Therefore, this Note adopts a definition of research tool that was developed by Professor Janice M. Mueller: "patented tools used in development of new biotechnological or pharmaceutical products that do not themselves physically incorporate the tool."[17] Under this definition, end products do not infringe patents covering the research tool,[18] and a tool provider cannot capture any value from the end product.[19] In particular, this Note addresses research tools used in the discovery and development of FDA-regulated products.

13. *Id.*

14. *See id.* ("What a user sees as a research tool, a provider may see as a valuable end product for sale to customers.").

15. *Id.* ("For example, a DNA sequence that is currently of use only to researchers ultimately may prove to be a diagnostic marker . . . .").

16. *See, e.g.*, Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 207–08 (2005) (holding that preclinical studies of patented compounds—in this case a peptide—fall under the § 271(e)(1) exemption). The patented peptide in *Merck* was generally used as a research tool to "promote[] cell adhesion." *Id.* at 197. However, Merck, the defendant in *Merck v. Integra*, was attempting to gain approval of the peptide as an end product for therapeutic purposes. *See id.* at 200 (noting that Merck supplied the peptide for "experiments related to angiogenesis").

17. Mueller, *supra* note 11, at 14.

18. *See id.* at 14–15 (noting that under this definition, the end products created by using the research tools "would not trigger the 'sells' or 'offers to sell' liability provisions of the Patent Act").

19. The ability to recoup some of the financial benefits of their research tool patents is of paramount concern to many biotech tool providers. *See* NIH RESEARCH TOOLS REPORT, *supra* note 12 (noting that "[i]f the claims of the patent are broad enough to cover future products arising from its use" then the tool provider may be willing "to make the technology freely available for use in research, while collecting royalties on resulting commercial products").

B. OVERVIEW OF THE PATENT SYSTEM

The Constitution gives Congress the power "[t]o promote the Progress of Science and the useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries."[20] The government grants patents to patentees for any invention that is new and useful,[21] not anticipated,[22] and non-obvious in view of the prior art.[23]

The Founding Fathers envisioned a patent system that benefits society, and the laws that implement the system must advance the intended benefits.[24] Thomas Jefferson, a driving force behind the country's fledgling patent system, recognized that patents could benefit society by encouraging development of new and useful technologies.[25] Therefore, according to Jefferson, when Congress creates a patent law, it must be "an inducement . . . to bring forth new knowledge" for the benefit of society.[26] Congress chose a limited exclusionary right as the benefit to induce innovation.[27]

C. COMMON LAW RESEARCH EXCEPTION

In light of the social-benefit justification for patents, courts recognize a research exception for activities that would other-

20. U.S. CONST. art. I, § 8, cl. 8.

21. 35 U.S.C. § 101 (2000).

22. *Id.* § 102.

23. *Id.* § 103.

24. *Cf.* Graham v. John Deere Co. of Kan. City, 383 U.S. 1, 6 (1966) (noting that Congress would violate a Constitutional standard if it were to grant the "patent monopoly without regard to the innovation, advancement or *social benefit* gained thereby" (emphasis added)).

25. *See* Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813), *in* THE PORTABLE THOMAS JEFFERSON 530 (Merrill D. Peterson ed., 1975) (noting that patents "encourage[] . . . men to pursue ideas which may produce utility" by granting an "exclusive right to the profits arising from them").

26. *Id.*; *see also* Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480 (1974) ("The patent laws promote this progress by offering a right of exclusion . . . as an incentive to inventors to risk the often enormous costs in terms of time, research, and development. The productive effort thereby fostered will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens.").

27. 35 U.S.C. § 154(a) (2000) (granting "the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States" until twenty years from the filing date of the patent application). The patent statute also provides for either monetary damages or injunctive relief for damages. *See* 7 DONALD S. CHISUM, CHISUM ON PATENTS § 20.01 (Supp. 2005).

wise infringe so as to promote "philosophical experiments."[28] Justice Story adopted and developed the common law research exception in *Whittemore v. Cutter*[29] and *Sawin v. Guild*.[30] Justice Story asserted that using a patented invention for research purposes was not considered infringing[31] unless the research was for a commercial purpose.[32]

While many courts have agreed with the policy underlying the common law research exception, they have narrowly construed it.[33] The case of *Roche Products, Inc. v. Bolar Pharmaceutical Co.*[34] exemplifies the limiting view courts give the experimental use exception. Roche owned the patent covering flurazepam hydrochloride (flurazepam HCl), the active ingredient in a successful sleeping pill.[35] Less than a year before Roche's patent was to expire, Bolar, a manufacturer of generic drugs, obtained the compound from a foreign manufacturer.[36] Bolar used the foreign flurazepam HCl in experiments to obtain data necessary for an FDA New Drug Application.[37] Bolar only conducted these experiments to bring a generic version of the sleeping pill to market as quickly as possible *after* expiration of Roche's patent.[38]

After Roche sued Bolar for patent infringement, Bolar admitted that its use of flurazepam HCl was for a commercial purpose, but argued that the use should not constitute infringement.[39] Bolar justified its position by arguing that its use

28. Whittemore v. Cutter, 29 F. Cas. 1120, 1121 (Story, Circuit Justice, C.C.D. Mass. 1813) (No. 17,600).

29. *Id.*

30. 21 F. Cas. 554 (Story, Circuit Justice, C.C.D. Mass. 1813) (No. 12,391).

31. *See Whittemore*, 29 F. Cas. at 1121 ("[I]t could never have been the intention of the legislature to punish a man, who constructed [the patented invention] merely for philosophical experiments.").

32. *See Sawin*, 21 F. Cas. at 555 ("[For] the making of a patented machine to be an offence . . . it . . . must be the making with an intent to use for profit, and not for the mere purpose of philosophical experiment.").

33. *See* Poppenhusen v. Falke, 19 F. Cas. 1048, 1049 (C.C.S.D.N.Y. 1861) (No. 11,279) (stating that the research exception was limited to use of a patented invention which was for "the sole purpose of gratifying a philosophical taste, or curiosity, or for mere amusement"); Mueller, *supra* note 11, at 21–22 (discussing the development of the research exception).

34. 733 F.2d 858 (Fed. Cir. 1984).

35. *Id.* at 860.

36. *Id.*

37. *Id.*

38. *Id.*

39. Roche Prods., Inc. v. Bolar Pharm. Co., 572 F. Supp. 255, 257 (E.D.N.Y. 1983), *rev'd*, 733 F.2d 858 (Fed. Cir. 1984).

of the compound was "*de minimis* . . . and no commercial value or profit will be realized before the patent on the drug expires."[40] The district court agreed with Bolar, refused to find infringement, and held that the post-expiration delay created by FDA regulation should not benefit the patentee.[41]

The Court of Appeals for the Federal Circuit reversed, finding that, because Bolar was experimenting on flurazepam HCl for the purpose of commercializing the generic drug, its actions could not fall under the experimental use exception.[42] The Federal Circuit refused to apply the experimental use exception to clearly commercial acts.[43] While acknowledging that FDA regulation of generics created a de facto monopoly for as many as two years after a patent expires,[44] the Federal Circuit declined to extend the research exception to Bolar's use, concluding that the court was not the proper forum to remove the de facto monopoly.[45]

D. CONGRESS'S RESPONSE: THE HATCH-WAXMAN ACT

Congress swiftly reacted to *Roche* by enacting the Drug Price Competition and Patent Term Restoration Act of 1984[46] (known as the Hatch-Waxman Act after its primary congressional sponsors). The Hatch-Waxman Act has two effects on patents. First, for pioneer drugs, the Act provides a patent term extension to compensate for the patent term lost due to the regulatory process of new drug approval.[47] Second, the Act exempts uses like that of Bolar, i.e., experiments conducted in preparation for submitting information to the FDA. The Act states:

40. *Id.*

41. *Id.* at 258 (noting that a regulatory delay "is not a right or benefit granted by the patent law").

42. *Roche*, 733 F.2d at 863 ("'[T]ests, demonstrations, and experiments . . . [which] are in keeping with the legitimate business of the . . . [alleged infringer]' are infringements for which '[e]xperimental use is not a defense.'" (alterations in original) (quoting Pitcairn v. United States, 547 F.2d 1106, 1125–26 (Ct. Cl. 1976))).

43. *Id.*

44. *Id.* at 864.

45. *Id.* at 865 (noting that it is Congress's role "to maximize public welfare through legislation" and that the courts' role "is only to interpret and apply that legislation").

46. Pub. L. No. 98-417, 98 Stat. 1585 (1984) (codified in scattered sections of 21 U.S.C. and 35 U.S.C.).

47. 35 U.S.C. § 156 (2000). A discussion of patent term extension under the Hatch-Waxman Act is beyond the scope of this Note.

> It shall not be an act of infringement to make, use, offer to sell, or sell within the United States or import into the United States a patented invention . . . solely for uses reasonably related to the development and submission of information under a Federal law which regulates the manufacture, use, or sale of drugs . . . .[48]

Section 271(e)(1) was enacted to supersede the holding of *Roche*.[49] Congress was particularly concerned that FDA regulation was unnecessarily delaying the release of generic drugs after the expiration of the pioneer patent.[50] Congress recognized that the new provision would create some interference with patentees' rights; it reasoned, however, that the interference was acceptable because marketing of generic products could not occur until the pioneering patent expired.[51] Congress believed that, if it did not create the exemption, pioneer companies would be unreasonably isolated from free market competition.[52] Congress also argued that delays resulting from FDA regulation necessitated the exemption.[53]

II. INTERPRETATION OF § 271(e)(1)

The language of § 271(e)(1) is perplexing. Courts have tried to clarify the statute but have had limited success.[54] In particular, courts have struggled with three issues: What is a "patented invention"? What meaning, if any, should be attached to "solely"? And what types of activities are "reasonably related to the development and submission of information under a Federal law which regulates . . . drugs"?

48. *Id.* § 271(e)(1).

49. H.R. REP. NO. 98-857, pt. 2, at 27 (1984), *reprinted in* 1984 U.S.C.C.A.N. 2686, 2711 (stating that § 271(e)(1) was meant to "have the net effect of reversing the holding of the court in *Roche Products, Inc. v. Bolar Pharmaceutical Co.*").

50. *Id.* at 29, *reprinted in* 1984 U.S.C.C.A.N. 2686, 2713 (arguing that the new § 271(e)(1) allows generic drugs to reach the market as much as two years sooner, which in turn will lead to a reduction in health care costs).

51. *Id.* at 30, *reprinted in* 1984 U.S.C.C.A.N. 2686, 2714.

52. *Cf. id.* (noting that the then-existing patent laws "protect the pioneer drug company from competition for a period of up to 2 years after the patent has expired").

53. *Id.* ("[I]n the automobile industry there would be no need to permit testing of a patented auto engine before a patent expires because—unlike the FDA in the drug area—there is no government regulatory agency in place which would delay marketing . . . once the patent has expired.").

54. *See* 5 CHISUM, *supra* note 27, § 16.03[1][d][iii] ("Section 271(e)(1)'s awkward wording has vexed the courts.").

A. "PATENTED INVENTION"

In *Eli Lilly & Co. v. Medtronic, Inc.*, the Supreme Court provided insight into the meaning of "patented invention."[55] Eli Lilly owned patents on an implantable cardiac defibrillator used in the treatment of heart patients.[56] Medtronic argued that, because its manufacture and use of the medical device was for testing to obtain FDA approval,[57] its use qualified for the § 271(e)(1) exemption.[58] Eli Lilly countered by arguing that, because § 271(e)(1) only refers to drugs, medical devices do not qualify for the exemption.[59]

In an opinion by Justice Scalia, the Supreme Court held that Congress intended to include medical devices under the § 271(e)(1) exemption.[60] The Court found that, while § 271(e)(1) only mentions drugs, "patented invention" in this provision "include[s] all inventions, not drug-related inventions alone."[61] Justice Scalia noted that if Congress intended to include only drug patents, it would have used clearer language.[62]

Next, the Court posited that a "Federal law which regulates . . . drugs" in § 271(e)(1) refers to an entire Act, so long as at least some of the Act's provisions regulate drugs.[63] In reaching this conclusion, the Court relied on Congress's intent to eliminate the distorting effects of the regulatory process at both ends of a pioneering product's patent term. Specifically, 35

55. 496 U.S. 661 (1990).

56. *Id.* at 664.

57. Eli Lilly & Co. v. Medtronic, Inc., 872 F.2d 402, 403 (Fed. Cir. 1989), *aff'd*, 496 U.S. 661 (1990).

58. *See Eli Lilly*, 496 U.S. at 664.

59. *See id.* at 665–66 (summarizing Eli Lilly's argument that "a Federal law which regulates the manufacture, use, or sale of drugs" refers "only to those individual provisions of federal law that regulate[s] drugs").

60. *See id.* at 670–72 (emphasizing that—because both drugs and medical devices were granted patent term extensions under § 201 of the Hatch-Waxman Act—§ 202, codified at 35 U.S.C. § 271(e)(1), applies to both drugs and medical devices).

61. *Id.* at 665 ("When used in this title unless the context otherwise indicates . . . [t]he term 'invention' means invention or discovery." (quoting 35 U.S.C. § 100(a))).

62. *See id.* at 667 (giving examples of language that would have been clearer, such as "[i]t shall not be an act of infringement to make, use or sell a patented *drug* invention" (emphasis added)).

63. *Id.* at 665–67 (noting that § 271(e)(1) "used the word 'law' in its broader sense," and that when Congress "meant to refer to a particular provision of law rather than an entire Act, [it] referred to . . . 'under *the provision of* law'" (citation omitted)).

U.S.C. § 156 addresses the distortion due to pioneer product regulation at the beginning of the patent term, explicitly including both drugs and medical devices,[64] and § 271(e)(1) addresses the distortion due to generic regulation at the end of the patent term.[65] The Court found it implausible that Congress intended to address both distortions for drugs, but intended only to remedy the beginning-of-term distortion for medical devices. More specifically, the Court doubted that Congress intended to create an anticompetitive restriction at the end of a medical device's patent term by leaving in place the end-of-term distortion for medical devices.[66]

Nonetheless, the Supreme Court did not hold that every invention that is related to development of regulated products qualifies for the § 271(e)(1) exemption. Rather, the Court merely found that medical devices qualify. In making that finding, the Court gave weight to the fact that the product was itself subject to regulatory approval,[67] and that the regulatory approval process requires development and submission of information regarding the infringing product.[68] Therefore, *Eli Lilly* supports the proposition that "patented invention" in § 271(e)(1) only refers to regulated products, and not every class of patented invention.

B. "SOLELY"

The § 271(e)(1) exemption applies "*solely* for uses reasonably related to the development and submission of information under a Federal law which regulates . . . drugs."[69] The meaning of "solely" has confused courts, and many courts have neglected

64. *See* 35 U.S.C. §§ 156(a)(4), 156(f) (2000) (providing a term extension for a product "subject to a regulatory review period before its commercial marketing or use" and defining "product" to include drug products and medical devices, food additives, and color additives subject to FDA regulation).

65. *See Eli Lilly*, 496 U.S. at 672.

66. *See id.* (expressing skepticism that Congress meant to "leave in place an anticompetitive restriction at the end of the monopoly term but simultaneously expand the monopoly term itself" for medical devices).

67. *See id.* at 674 ("All of the products eligible for a patent term extension under § 201 are subject to § 202, since all of them . . . are *subject to premarket approval under various provisions of the FDCA*.") (emphasis added)).

68. *See id.* at 674 n.6 (noting that it is "the requirement of premarket approval" which leads to the "need for 'development and submission of information'" (quoting Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585, 1603 (codified as amended at 35 U.S.C. § 271 (2000)))).

69. 35 U.S.C. § 271(e)(1) (2000) (emphasis added).

to analyze it.[70] However, some early district court cases discussed the meaning of "solely." *Scripps Clinic & Research Foundation v. Genentech, Inc.* found that "solely" limited the exemption to uses that were meant only to prepare information for submission to the FDA.[71] The court in *Scripps Clinic & Research Foundation v. Baxter Travenol Laboratories, Inc.* came to the opposite conclusion and criticized the *Genentech* decision, arguing that the court "interpreted the statute to only cover activities that were 'solely related' to FDA approval and did not consider what acts are 'reasonably related' to [FDA approval]."[72]

The Federal Circuit implicitly sanctioned the "reasonably related" limitation in *Telectronics Pacing Systems, Inc. v. Ventritex, Inc.*, effectively overruling the *Genentech* decision.[73] As discussed below, much of the analysis in *Telectronics* focuses on the meaning of "reasonably related," but the Federal Circuit also noted that "solely" does not mean that uses must be limited to preparing information for the FDA in order to qualify for the exemption.[74] The commercial nature of the alleged infringing use also did not persuade the *Telectronics* court, which found that Congress was aware of the commercial nature of drug development.[75] The Federal Circuit further clarified this implicit holding in *AbTox, Inc. v. Exitron Corp.*, holding that the attendant circumstances of a use do not affect the § 271(e)(1) analysis and that the section "allows [uses] for more

70. *See, e.g.*, Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 206 (2005) (focusing on the "reasonably related" portion of the provision in finding that even "research conducted on patented compounds for which an [investigational new drug application] is not ultimately filed" falls under the exemption).

71. 666 F. Supp. 1379, 1396–97 (N.D. Cal. 1987) (finding that while some uses by Genentech were reasonably related to meeting FDA requirements, these uses also related to "performance of the Genentech-Cutter agreement to develop a process of manufacturing [the patented compound] on a commercial scale" and thus did not fall under the § 271(e)(1) exemption), *aff'd in part and rev'd in part*, 927 F.2d 1565 (Fed. Cir. 1991).

72. Civ. A. No. 87-140-CMW, 1988 WL 22602, at *6 (D. Del. Mar. 9, 1988).

73. 982 F.2d 1520 (Fed. Cir. 1992).

74. *Cf. id.* at 1523–24 (finding that Ventritex's use of clinical data for soliciting investors, as well as for gaining FDA approval, did not remove the clinical trial from the § 271(e)(1) exemption).

75. *See id.* at 1525 (noting that Congress was not "indifferent to the economics of developing and marketing drugs," and "could not have been unaware of the need of competitors to raise funds for developing and testing competing products").

than FDA approval."[76] Thus, the Federal Circuit found that a patented invention may be used for purposes other than, and in addition to, FDA approval and still fall within the § 271(e)(1) exemption, so long as the use is still related to FDA regulation.[77]

C. "REASONABLY RELATED . . ."

It is clear from the background and legislative history of the Hatch-Waxman Act that § 271(e)(1) exempts experiments on a patented drug for the purpose of gaining approval to market a generic version of that drug.[78] However, the language of the statute and the legislative history provide little insight into what other acts might be "reasonably related" to submission of information to the FDA.

1. *Telectronics Pacing Systems v. Ventritex*

In *Telectronics Pacing Systems, Inc. v. Ventritex, Inc.*, the Federal Circuit analyzed the meaning of the "reasonably related" requirement of § 271(e)(1).[79] Ventritex was conducting clinical trials under an Investigational Device Exemption (IDE) from the FDA for an implantable defibrillator that was covered by several Telectronics patents.[80] The IDE allowed Ventritex to sell its device for implantation into patients to obtain data regarding the defibrillator's clinical operation.[81] Ventritex also displayed the defibrillator to both physicians and non-physicians at medical conferences.[82] Finally, Ventritex described the clinical trial data to investors, analysts, and journalists, in part to raise funds for additional clinical trials.[83]

Telectronics argued that demonstrating the defibrillator to non-physicians at medical conferences was not "solely for uses related to FDA approval" and thus did not qualify for the § 271(e)(1) exemption.[84] Telectronics also argued that, although the clinical trials were originally exempt, they "lost" their ex-

76. 122 F.3d 1019, 1030 (Fed. Cir. 1997).

77. *Id.*

78. *See* H.R. REP. NO. 98-857, pt. 2, at 29–30 (1984), *reprinted in* 1984 U.S.C.C.A.N. 2686, 2713–14.

79. 982 F.2d 1520, 1522–25 (Fed. Cir. 1992).

80. *Id.* at 1521.

81. *Id.*

82. *Id.*

83. *Id.* at 1521–22.

84. *Id.* at 1522–23.

empt status because the data from these trials was later provided to potential investors for "purposes unrelated to FDA reporting requirements."[85]

The Federal Circuit rejected Telectronics's arguments. First, the court found that demonstrating the defibrillator to recruit physicians for clinical trials was reasonably related to FDA approval.[86] The court also agreed with Ventritex that the "collateral" use of clinical data for fundraising does not, by itself, constitute infringement, and thus cannot repeal the exemption.[87] *Telectronics* was the Federal Circuit's first indication that exempt activities need not have a direct relationship to the information submitted to the FDA in order to be "reasonably related."

2. *Merck KGaA v. Integra Lifesciences I, Ltd.*

More than a decade after *Telectronics*, courts still grapple with the precise connection that must exist between otherwise patent infringing activities and the information being submitted to the FDA in order for § 271(e)(1) to apply. *Merck KGaA v. Integra Lifesciences I, Ltd.* gave the Supreme Court an opportunity to further illuminate the "reasonably related" language.[88]

Like many cases involving § 271(e)(1), *Merck* dealt with a patented pharmaceutical product. However, unlike many § 271(e)(1) cases, the alleged infringer was not conducting experiments for the approval of a generic version of a drug covered by a soon-to-expire patent. Rather, the defendant, Merck, was conducting research on a completely new use of a patented compound.

Integra owned several patents covering a tripeptide (the Arg-Gly-Asp, or RGD peptide) which promotes cell adhesion to a particular integrin receptor.[89] Dr. David Cheresh, in research funded by Merck, discovered that some RGD peptides were useful as inhibitors of angiogenesis, the process of new blood vessel formation that plays "a critical role in many diseases, including

85. *Id.* at 1523.

86. *Id.* The court also noted that "[t]he fact that some non-physicians may have seen the device at the conferences is merely incidental and of minimal import, since only physicians can implant the device." *Id.*

87. *Id.* at 1523–24.

88. 545 U.S. 193, 202–08 (2005).

89. *Id.* at 197.

solid tumor cancers."[90] After this discovery, Merck and Dr. Cheresh entered into an agreement by which Merck would continue to fund Cheresh's research while Cheresh identified an RGD peptide as a drug candidate.[91] Once this primary candidate was in "the pipeline," Merck would perform the toxicology tests necessary for FDA approval to proceed with clinical trials.[92] Dr. Cheresh's research eventually identified "the most promising candidate for testing in humans."[93] Merck then began the FDA approval process for the selected RGD peptide.[94]

At trial, the jury found Merck liable for infringement of Integra's RGD peptide patents.[95] Furthermore, the jury found that Merck had failed to show that Cheresh's research activities were exempt under § 271(e)(1).[96]

The Federal Circuit identified the issue as whether the § 271(e)(1) exemption includes identification of new drugs, which are themselves subject to FDA regulation.[97] After analyzing the language of the section, the court found that "reasonably related" does not include activities that do not directly produce information submitted for FDA approval.[98] The court cited the submission of safety and effectiveness information to the FDA as an example of a use that directly produces information for the FDA, and thus qualifies for the exemption.[99] Cheresh's research did not qualify under this "reasonably related" requirement.[100] The Federal Circuit argued that "§ 271(e)(1) simply does not globally embrace all experimental activity that at some point, however attenuated, may lead to an FDA approval process."[101]

The court further argued that although Dr. Cheresh's research did not involve research tools, because it was so early in

90. *Id.*
91. *Id.* at 198.
92. *Id.*
93. *Id.* at 199.
94. *Id.*
95. *Id.* at 200–01.
96. *Id.* at 201.
97. *See* Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 865–66 (Fed. Cir. 2003), *vacated and remanded*, 545 U.S. 193 (2005).
98. *See id.* at 866 ("Activities that do not *directly* produce information for the FDA are already straining the relationship to the central purpose of the safe harbor." (emphasis added)).
99. *See id.*
100. *Id.*
101. *Id.* at 867.

the development cycle, expansion of § 271(e)(1) to include Cheresh's research would "effectively vitiate the exclusive rights of patentees owning biotechnology [research] tool patents."[102] An excessively broad exemption would effectively eliminate patent protection for certain classes of inventions.[103]

While the Supreme Court agreed that "basic research" toward the development of a new drug is not "reasonably related to the development and submission of information,"[104] the Court did not agree that § 271(e)(1) completely precludes research like Dr. Cheresh's from exemption.[105] The Court was also reluctant to read the "reasonably related" requirement too narrowly, fearing that a narrow interpretation would overly limit the protection of the exemption.[106] The Court acknowledged the Federal Circuit's fear that expanding the § 271(e)(1) exemption would deprive research-tool patentees of the "complete value of their patents."[107] Nevertheless, it declined to decide whether § 271(e)(1) exempts research tool use, because the RGD peptides at issue were not research tools, but rather were regulated end products.[108]

The Supreme Court concluded that preclinical studies are protected under § 271(e)(1) as long as there is a reasonable basis for believing that the research will produce "the types of information that are relevant" to an FDA approval application.[109] Applying this conclusion, the Court found that the § 271(e)(1) exemption applies to all uses of patented inventions "that are

102. *Id.*

103. *See id.* (arguing that extending the exemption in such a way "would swallow the whole benefit of the Patent Act for some categories of biotechnological inventions").

104. *See* Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 205–06 (2005).

105. *Id.* at 206 ("It does not follow from this, however, that § 271(e)(1)'s exemption from infringement categorically excludes [activities like those of Dr. Cheresh].").

106. *Id.* at 207 (noting that a limited interpretation might "render § 271(e)(1)'s stated protection of activities leading to FDA approval for all drugs illusory").

107. *Id.* at 205 n.7.

108. *Cf. id.* (declining to address the research tools issue because Integra had not argued that the RGD peptides were research tools or that they had been used as such by Cheresh and Merck).

109. *Id.* at 208 (quoting Brief for the United States as Amicus Curiae Supporting Petitioner at 23, *Merck*, 545 U.S. 193 (No. 03-1237)).

reasonably related to the development and submission of *any* information under the [Food, Drug, and Cosmetic Act]."[110]

III. USE OF RESEARCH TOOLS DOES NOT FALL UNDER THE § 271(e)(1) EXEMPTION.

While the term "invention" in the patent statute usually means all inventions,[111] the context and legislative history of § 271(e)(1) indicate that "patented invention" does not refer to all inventions. Rather, Congress intended that § 271(e)(1) only apply to those inventions that themselves are subject to FDA regulation. Moreover, generally accepted patent policy also disapproves of instituting a blanket exemption for infringement of research tool patents. Unless Congress explicitly authorizes such a blanket exemption, courts would more effectively meet the patent system's beneficial goals by analyzing each research tool use on a case-by-case basis.

A. RESEARCH TOOLS ARE NOT "PATENTED INVENTIONS" UNDER § 271(e)(1).

When interpreting a statute, the language's meaning is determined by looking at the "statutory language at issue, as well as the language and design of the statute as a whole."[112] Moreover, the legislative history of a statute "may aid our understanding of the function and purposes of the statute, and in cases of doubt assist in interpretation of the language."[113] Thus, the meaning of "patented invention" must be consistent with the remainder of § 271(e)(1) and with Congress's purpose behind the exemption.

The remainder of § 271(e)(1) limits exempt uses to those uses involving "development and submission of information under a Federal law which *regulates* the manufacture, use, or sale of drugs."[114] This additional language gives rise to two plausible interpretations of "patented invention": (1) "patented invention" is a product subject to premarket regulation by the

110. *Id.* at 202.

111. 35 U.S.C. § 100(a) (2000) ("[U]nless the context otherwise indicates . . . [t]he term 'invention' means [any] invention or discovery.").

112. K Mart Corp. v. Cartier, Inc., 486 U.S. 281, 291–92 (1988), *quoted in* Sullivan v. Stroop, 496 U.S. 478, 482 (1990).

113. Telectronics Pacing Sys., Inc. v. Ventritex, Inc., 982 F.2d 1520, 1524 (Fed. Cir. 1992) (citing VE Holding Corp. v. Johnson Gas Appliance Co., 917 F.2d 1574, 1580 (Fed. Cir. 1990)).

114. 35 U.S.C. § 271(e)(1) (2000) (emphasis added).

FDA, i.e., the regulation referred to in § 271(e)(1) is regulation of the "patented invention" itself; or (2) "patented invention" is independent of the "regulation" referred to later in § 271(e)(1) and may be any type of "patented invention," including one that itself is not subject to government regulation. As this Note will explain, only the first interpretation is consistent with Congress's intent.

1. Congress Intended "Patented Invention" in § 271(e)(1) to Include Only Inventions That Are Subject to FDA Regulation.

It is a more logical and more widely accepted reading of § 271(e)(1) to interpret "patented invention" as limited to a product that is subject to FDA regulation.[115] This interpretation is also consistent with a plain reading of the patent statute and with Congress's intent to compensate for patent term distortions for products that are subject to FDA regulation.[116]

The federal statute governing patents states that "unless the context [of the statute] otherwise indicates . . . 'invention' means [any] invention or discovery."[117] Because § 271(e)(1) explicitly applies only to "patented inventions" and further restricts the scope of the infringement exemption to activities "reasonably related" to FDA regulation, courts should not read the provision as applying to all inventions.[118]

It also is evident from the legislative history of the Hatch-Waxman Act that "patented invention" includes drugs that are subject to FDA regulation and in particular generic versions of

115. *See* Brief for Invitrogen Corp., et al. as Amici Curiae in Support of Respondents at 7, Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193 (2005) (No. 03-1237) [hereinafter Invitrogen Amicus Brief] (noting that in only one case, *Bristol-Myers Squibb v. Rhone-Poulenc Rorer*, No. 95 Civ. 8833(RPP), 2001 WL 1512597 (S.D.N.Y. Nov. 28, 2001), has a court invoked § 271(e)(1) for a research tool patent and that "[t]he absence of litigation in which Section 271(e)(1) has been invoked" for research tools indicates a "*common understanding among members of the patent and scientific communities* . . . that Section 271(e)(1) does not authorize infringing uses of patented research tools" (emphasis added)).

116. *See* H.R. REP. NO. 98-857, pt. 1, at 15 (1984), *reprinted in* 1984 U.S.C.C.A.N. 2647, 2648 (stating that "[t]he purpose of Title II of the Hatch-Waxman Act is to create a new incentive for . . . the restoration of some of the time lost on patent life while the product is awaiting market approval" and that "it is not an act of patent infringement for a generic drug maker to import or to test a patented drug in preparation for seeking FDA approval [of a generic form of that drug]").

117. 35 U.S.C. § 100(a) (2000).

118. *See* 35 U.S.C. § 271(e)(1) (2000).

patented drugs.[119] The only products specifically mentioned within the legislative history of the Hatch-Waxman Act are drugs.[120] Even the bill's opponents limited their arguments to the bill's effect on patented drugs and generic drugs.[121] The Committee on Energy and Commerce stated that "[t]he purpose of section[] 271(e)(1) . . . is to establish that experimentation with a patented drug product . . . is not a patent infringement."[122] The Committee also stated its intention that § 271(e)(1) would allow for "experimental use of a drug product" when "the only purpose of the experiments is to seek FDA approval . . . of *the drug*."[123] The use of "the" before "drug" in this passage indicates that "the drug" submitted for FDA approval is the same drug as "the drug" involved in experiments, and it is this experimentation that is exempted.[124] Judge Newman of the Federal Circuit, who wrote a partial dissent in *Integra Lifesciences v. Merck*, seems to agree with this interpretation of "patented invention,"[125] as does the federal executive branch.[126]

119. *See, e.g.*, H.R. REP. NO. 98-857, pt. 2, at 27, *reprinted in* 1984 U.S.C.C.A.N. 2686, 2711 (stating that the provision which became 35 U.S.C. § 271(e)(1) "ha[s] the net effect of reversing the holding of the court in *Roche Products, Inc. v. Bolar Pharmaceutical Co., Inc.*" (citation omitted)); *see also id.* at 29, *reprinted in* 1984 U.S.C.C.A.N. at 2713 (noting that "generic drugs will be able to be placed on the market between 18 months and 2 years earlier than without [§ 271(e)(1)]").

120. *See, e.g.*, *id.* at 29–30, *reprinted in* 1984 U.S.C.C.A.N. at 2713–14 (discussing the benefits of the provision for generic drug manufacturers and predicting that it will reduce medical costs for individuals).

121. *See, e.g.*, 130 CONG. REC. 24,979 (1984) (statement of Sen. Metzenbaum) (opposing the bill and arguing that, while the Hatch-Waxman Act may reduce prices of generic drugs, the concessions made to the prescription drug industry in order to get this provision through Congress "will give the pharmaceutical manufacturers additional extended time in connection with their patented drugs").

122. H.R. REP. NO. 98-857, pt. 1, at 45, *reprinted in* 1984 U.S.C.C.A.N. at 2678.

123. *Id.* at 45–46, *reprinted in* 1984 U.S.C.C.A.N. at 2678–79 (emphasis added).

124. *Cf. id.*, pt. 2, at 30, *reprinted in* 1984 U.S.C.C.A.N. 2686, 2714 ("[A]ll that the generic [drug company] can do *is test the drug* for purposes of submitting data to the FDA for approval." (emphasis added)).

125. *Cf.* Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 878 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part) ("Use of an existing [research] tool in one's research is quite different from study of the tool itself."), *vacated and remanded*, 545 U.S. 193 (2005); *id.* at 878 n.10 (distinguishing "between investigation *into* patented things, as has always been permitted [by the common law research exception], and investigation *using* patented things [such as research tools], as has never been permitted") (emphasis added)).

Congress also indicated that uses exempted by § 271(e)(1) should have a limited effect on the patentee's interests during the patent term[127] to avoid constitutional taking issues.[128] Congress noted that when determining whether there has been an unlawful taking, interference with the patentee's property rights must be balanced with the "public program adjusting the benefits and burdens of economic life to promote the public good."[129] The legislative history of the Hatch-Waxman Act indicates that Congress believed the Act struck a proper balance because it would cause little economic damage to patentees while substantially benefiting the country as a whole.[130]

Section 271(e)(1) has a more detrimental economic impact if courts interpret the term "patented inventions" to include research tools that are used to identify and develop new pharmaceuticals rather than to include only the regulated products themselves. There are several dangers in extending § 271(e)(1) to include research tools.

First, this interpretation will impose severe economic harm on tool patent owners. Many biotechnology research tools are used exclusively, or nearly exclusively, in drug research.[131] If courts were to include research tools under the § 271(e)(1) exemption, the competitors and potential customers of tool developers would be free to use a patented tool without compensating the developer, thereby eviscerating the economic benefit of the developer's patent rights.[132] This result is clearly not the

126. *See* Brief for the United States as Amicus Curiae Supporting Petitioner at 29, Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193 (2005) (No. 03-1237) [hereinafter United States Amicus Brief] ("Congress may well not have intended to include tool patents in the scope of affected inventions.").

127. H.R. REP. NO. 98-857, pt. 1, at 46, *reprinted in* 1984 U.S.C.C.A.N. 2647, 2679; *see also id.*, pt. 2, at 30, *reprinted in* 1984 U.S.C.C.A.N. 2686, 2714 (1984) (describing the interference with pioneer drug manufacturers as de minimis).

128. *See id.* at 29, *reprinted in* 1984 U.S.C.C.A.N. at 2713.

129. *Id.* (citation omitted).

130. *See id.* ("In this case, the Committee has merely . . . balance[d] the need to stimulate innovation against the goal of furthering the public interest.").

131. *See*, *e.g.*, United States Amicus Brief, *supra* note 126, at 29 (noting that some research tools "are used *only* in experimentation within the scope of Section 271(e)(1)" (emphasis added)).

132. *See id.* (arguing that including research tools under the § 271(e)(1) exemption could "adversely impact the only exclusive right that exists with respect to such tools—the right to use them in research"); Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 867 (Fed. Cir. 2003) (arguing that expansion of the § 271(e)(1) exemption "would effectively vitiate the exclusive rights

"de minimis" interference that Congress believed would avoid an unconstitutional taking. Moreover, Congress has made no investigation to determine if exempting research tools under § 271(e)(1) provides enough societal benefit to offset the substantial interference with tool patent rights. Expanding the scope of the exemption beyond the limits contemplated by Congress would therefore be improper.

Second, a major problem that § 271(e)(1) addressed was the de facto patent term windfall that reverted to a patentee due to the regulatory delay of approving generic substitutes.[133] This problem does not exist where the product in question is not subject to governmental regulation, because competitors may begin selling copies of the product as soon as the patent in question expires.[134] Research tools, as defined in Section I.A above, are not subject to premarket FDA regulation because they do not become part of the end product that eventually is marketed to consumers.[135] Therefore, the problem of a de facto patent term extension does not exist in the context of research tools because research tool patentees receive no such windfall.[136]

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of patentees owning biotechnology tool patents. . . . [and] would swallow the whole benefit of the Patent Act for some categories of biotechnological inventions"), *vacated and remanded*, 545 U.S. 193 (2005).

133. *See* H.R. REP. NO. 98-857, pt. 2, at 4, *reprinted in* 1984 U.S.C.C.A.N. 2686, 2688 (describing how the then-existing regulatory rules resulted in "the practical extension of the monopoly position of the patent holder beyond the expiration of the patent"); *id.* at 30, *reprinted in* 1984 U.S.C.C.A.N. at 2714 ("To hold otherwise would be to protect the pioneer drug company from competition for a period of up to 2 years after the patent has expired [because of regulatory delay]."); Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 669 (1990) (noting that the Hatch-Waxman Act was "designed to respond to two unintended distortions" produced by the requirement that "certain products must receive premarket regulatory approval").

134. *Cf.* H.R. REP. NO. 98-857, pt. 2, at 30, *reprinted in* 1984 U.S.C.C.A.N. at 2714 ("For example, in the automobile industry there would be no need to permit testing of a patented auto engine before a patent expires because—unlike the FDA in the drug area—there is no government regulatory agency in place which would delay marketing of that new product and prevent competition once the patent has expired."). *But see* AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1028–29 (Fed. Cir. 1997) (finding that Class II medical devices, which are not subject to extensive, dilatory FDA regulation, qualify for the § 271(e)(1) exemption), *amended on reh'g*, 131 F.3d 1009 (Fed. Cir. 1997).

135. *See* Mueller, *supra* note 11, at 14 (defining research tools as "those patented tools used in development of new biotechnological or pharmaceutical products that do not themselves physically incorporate the tool").

136. *See* United States Amicus Brief, *supra* note 126, at 29 (noting that "research tools are not typically subject to those [regulatory] requirements" so

The plain meaning of the federal statute governing patents and the legislative history of the § 271(e)(1) exemption indicate that courts should interpret the term "patented inventions" as including only inventions that are subject to FDA regulation.[137]

2. Court Decisions Interpreting the Term "Patented Inventions" Do Not Conclusively Hold That the Term Applies to Inventions That Are Not Subject to FDA Regulation.

Many courts find it appealing to interpret "patented invention" plainly to include all inventions instead of just FDA-regulated inventions.[138] However, since nearly every case that has analyzed § 271(e)(1) has done so in the context of a patented product subject to FDA regulation, the courts have yet to answer the question of how to apply the term to inventions that are not regulated by the FDA.[139]

a. Eli Lilly & Co. v. Medtronic, Inc.

Admittedly, in *Eli Lilly & Co. v. Medtronic, Inc.*, the Supreme Court seemed to endorse a narrower definition of "patented inventions" than the one proposed in this Note.[140] But, in *Eli Lilly*, the Supreme Court was deciding whether medical devices were patented inventions under § 271(e)(1).[141] However,

that the problem of "[an effective extension of patent terms] is generally inapplicable to research tools").

137. This does not mean that such use of research tools may not fall under a common law research exception. *See, e.g.*, Mueller, *supra* note 11, at 31 ("The emergent consensus is that . . . general common law [research] exemption continues to have vitality . . . .").

138. *See, e.g.*, Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc., No. 95 Civ. 8833(RPP), 2001 WL 1512597, at *3 (S.D.N.Y. Nov. 28, 2001) ("[T]he Court applies the term 'patented inventions' in accordance with its plain meaning and rejects RPR's argument that the patented intermediates . . . are not 'patented invention[s]' under Section 271(e)(1)." (alteration in original)).

139. *See* Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 195–97 (2005) (determining whether preclinical experiments on a peptide used for cancer treatment fall under the § 271(e)(1) exemption); *Eli Lilly*, 496 U.S. at 663–64 (determining whether a cardiac defibrillator falls under the exemption); AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1020–21 (Fed. Cir. 1997) (devices for sterilizing medical instruments), *amended on reh'g*, 131 F.3d 1009 (Fed. Cir. 1997); Telectronics Pacing Sys., Inc. v. Ventritex, 982 F.2d 1520, 1521 (Fed. Cir. 1992) (cardiac defibrillator).

140. *See Eli Lilly*, 496 U.S. at 664 ("The phrase 'patented invention' in § 271(e)(1) is defined to include all inventions, not drug-related inventions alone.").

141. *See id.* at 663 (stating that the action involved "an implantable cardiac defibrillator, a medical device").

medical devices, including the defibrillator at issue in *Eli Lilly*, are subject to FDA regulation.[142] Also, the explicit purpose of the use the Court examined in *Eli Lilly* was submitting information for regulatory approval of the defibrillator.[143] Thus, the Supreme Court's holding in *Eli Lilly* is consistent with defining "patented invention" as including only inventions that are subject to FDA regulation.

b. Merck KGaA v. Integra Lifesciences I, Ltd.

Additionally, the reasoning and holding in *Merck* is consistent with the argument that the patented invention must be subject to FDA regulation. The Court approved of the jury instruction given at trial, which stated that to qualify for the § 271(e)(1) exemption the experiments must be believed to "generat[e] the kinds of information that are likely to be relevant in the processes by which the FDA would decide whether to approve the *product in question*."[144] The use of the phrase "product in question" implies that the product is subject to FDA approval, because it is the process of generating information which is "in question" when determining whether § 271(e)(1) applies. While the "product in question" in *Merck*, the RGD peptide, was subject to FDA regulation and thus qualified for the § 271(e)(1) exemption, research tools are not subject to FDA regulation and should not qualify for the infringement exemption.

c. Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc.

Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc. is the only case in which a court came close to ruling on the issue of whether biotech research tools are "patented inventions" under § 271(e)(1).[145] Consequently, this Note explores the district

142. *See, e.g.*, 21 U.S.C. § 360e (2000 & Supp. III 2004) (governing premarket approval of class III medical devices).

143. *Eli Lilly*, 496 U.S. at 663–64 (noting that the case concerned whether "activities . . . undertaken for the purpose of developing and submitting to the FDA information necessary to obtain marketing approval for a medical device" qualified for the § 271(e)(1) exemption).

144. *Merck*, 545 U.S. at 208 n.8 (emphasis added) (quoting and approving of the jury instruction given at trial).

145. No. 95 Civ. 8833(RPP), 2001 WL 1512597 (S.D.N.Y. Nov. 28, 2001). Two other recent district court decisions, *Classen Immunotherapies, Inc. v. Biogen IDEC*, 381 F. Supp.2d 452 (D. Md. 2005), and *Benitec Australia, Ltd. v. Nucleonics, Inc.*, No. Civ. A.04-0174 JJF, 2005 WL 2415959 (D. Del. Sept. 29, 2005), also dismissed cases dealing with research tool patents based on *Merck*

court's ruling and interpretation of "patented inventions." Significantly, the court's holding is consistent with interpreting the exemption as applying only to inventions that are subject to FDA regulation.

Rhone-Poulenc Rorer (RPR) charged Bristol-Myers Squibb (BMS) with infringement of its patents covering intermediates used to make the drug taxol.[146] BMS used the intermediates in research to find analogs that can replace taxol.[147] The intermediates arguably are research tools because they are "reagents"[148] that BMS used in the research process to run "hundreds of experiments for purposes of possibly identifying a drug candidate."[149]

RPR argued that these intermediates were not "patented inventions" under § 271(e)(1) because the intermediates were not eligible for a patent term extension under 35 U.S.C. § 156—which is also part of the Hatch-Waxman Act—and therefore did not qualify for an exemption under § 271(e)(1).[150] The court rejected this argument and found that the plain meaning of "patented invention" included the intermediates in question.[151] The district court relied heavily on *Eli Lilly & Co. v. Medtronic, Inc.*[152] and Federal Circuit precedent[153] to define "patented invention" broadly to include the intermediates.[154]

The court also rejected RPR's argument that such a broad interpretation of "patented invention" was contrary to the legis-

v. Integra. However, in neither case was the argument that research tools are not "patented inventions" under § 271(e)(1) advanced, and therefore neither case provides any analysis on this issue.

146. *Bristol-Myers Squibb*, 2001 WL 1512597, at *1.

147. *Id.* at *4 (noting that BMS "embarked on a taxane research and development program in an attempt to discover a new, more active drug that could replace taxol").

148. *See* NIH RESEARCH TOOLS REPORT, *supra* note 12 (including "reagents" in the list of products that may qualify as "research tools").

149. *Bristol-Myers Squibb*, 2001 WL 1512597, at *4.

150. *Id.* at *2.

151. *Id.* at *3.

152. *See* Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 665 (1990), *discussed in* Bristol-Myers Squibb, 2001 WL 1512597, at *2 ("The term patented invention in 271(e)(1) is defined to include all inventions, not drug-related inventions alone.").

153. Bristol-Myers Squibb, 2001 WL 1512597, at *2–3 (citing AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1028 (Fed. Cir. 1997), *amended on reh'g*, 131 F.3d 1009 (Fed. Cir. 1997); Chartex Int'l PLC v. M.D. Pers. Prods. Corp., 5 F.3d 1505, 1505 (Fed. Cir. 1993)).

154. *Id.* at *3.

lative history of the Hatch-Waxman Act.[155] In particular, the court found that the "contrary indicia" of the legislative history were insufficient to outweigh the plain language of § 271(e)(1).[156] However, the court failed to identify any "contrary indicia" and did not describe how they were deficient. Finally, the court argued that its holding was justified because it was consistent with Congress's intent "to encourage innovation and allow new drug products to be brought to market in a quicker fashion."[157]

Significantly, the *Bristol-Myers Squibb* decision does not directly address the question of whether research tools fall outside the scope of the § 271(e)(1) exemption. The intermediates discussed in the case are distinguishable from biotechnology research tools used to develop new drugs in an important way: they appear to have little practical use beyond making taxol or taxol analogs.[158] In essence, the intermediates were a specially adapted component of the taxol end products.[159] Thus, holding that the intermediates qualified for the § 271(e)(1) exemption permitted the district court to further Congress's intent and allow taxol and taxol analogs to come to market quickly after the taxol patent expired.[160]

In contrast, some research tools are not limited to one product. Rather, they are used in research for multiple end products.[161] For example, animal models,[162] such as the pat-

155. *Id.* at *3 n.6.

156. *Id.*

157. *Id.*

158. *Cf.* U.S. Patent No. Re. 34,277 col.1 (filed Nov. 1, 1991) (describing the preparation of taxol from the intermediates, and noting that taxol is "an especially important antileukaemic and antitumour agent" but observing that the intermediates "do not manifest these activities"); *Bristol-Myers Squibb*, 2001 WL 1512597, at *7 (indicating that the defendant was using the intermediates "in an attempt to discover a new, more active drug that could replace taxol").

159. The idea that protection from infringement should extend to specially adapted components of patented inventions is not new. *See* 35 U.S.C. § 271(c) (2000) (making it an act of contributory infringement to "sell . . . a component of a patented [invention] . . . knowing the same to be especially made or especially adapted for use in an infringement of such patent," even when the component is not patented).

160. *See Bristol-Myers Squibb*, 2001 WL 1512597, at *6.

161. *See* NIH RESEARCH TOOLS REPORT, *supra* note 12 (noting that some "broad spectrum research tools" are "useful in pursuing a wide range of research problems, and could potentially aid in the discovery [of] a wide range of future products").

162. *See id.* (including "animal models" in its list of "research tools").

ented Harvard "oncomouse,"[163] which is useful in cancer research,[164] can be used in experiments involving any compound designed to treat the cancer to which the oncomouse is susceptible. Also, research tools can be used at different stages of research. The Federal Circuit recognized this fact in *Integra Lifesciences v. Merck* when it noted that "patented tools often facilitate general research to identify candidate drugs, as well as downstream safety-related experiments on those new drugs."[165] Finally, including research tools as "patented inventions" under § 271(e)(1) will not help bring drugs to market faster because tools are not subject to regulation.

In summary, Congress intended to limit "patented invention" in § 271(e)(1) to products that are subject to FDA regulation, and the court decisions touching on this topic do not conflict with this interpretation. As a consequence, courts should not apply a broader definition when analyzing whether a research tool qualifies for the § 271(e)(1) exemption.

B. IT IS AGAINST PUBLIC POLICY TO INCLUDE RESEARCH TOOLS UNDER THE § 271(e)(1) EXEMPTION.

Developing and supplying research tools has grown into a massive industry within the biotechnology sector.[166] Patent protection is a critical aspect of doing business in biotechnology, particularly for startup companies[167] and research tool compa-

163. Transgenic Non-Human Mammals, U.S. Patent No. 4,736,866 (filed June 22, 1984).

164. *See* Mueller, *supra* note 11, at 13.

165. Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 867 (Fed. Cir. 2003), *vacated and remanded*, 545 U.S. 193 (2005).

166. *See, e.g.*, Invitrogen Amicus Brief, *supra* note 115, at 8 (estimating that the market for "analytical products and services" is $26 billion worldwide).

167. *Cf.* Burk & Lemley, *supra* note 2, at 1589 n.38 (noting that start-ups in biotechnology spend as much as ten percent of their budgets on patent protection and that one commentator has stated that patents "are absolutely essential to the success of traditional biotech startups").

nies.[168] Also, biotech research tools have made the search for new drugs easier and more efficient.[169]

Merck has expanded the class of activities that are "reasonably related" to the submission of information to the FDA. Now, according to the Supreme Court's decision in *Merck*, the § 271(e)(1) exemption reaches any experiment for which there is a "reasonable basis for believing that [it] will produce 'the types of information that are relevant to an [investigational new drug application] or [new drug application],'"[170] regardless of the stage of the experiment. Therefore, if research tools qualify as "patented inventions," the new *Merck* standard will allow § 271(e)(1) to reach the vast majority of drug research and thus the vast majority of biotech research tool uses.

To illustrate how early in the research cycle *Merck* might allow the exemption to reach, a short review of the FDA regulatory process is helpful. Research for a new drug generally involves three stages: the discovery stage, the development stage, and the regulatory stage.[171] The discovery stage includes identifying (1) a target disease, (2) a molecular "target" of a biological pathway in the body associated with the target disease,[172] and (3) compounds that affect the target. The development stage, sometimes referred to as the "preclinical" stage, includes determining which candidates are particularly strong and

168. *See, e.g.*, Vaccinex Amicus Brief, *supra* note 2, at 8–9 (arguing that "tool companies" rely on venture capital investments to survive, and that "patent protection will be critical in encouraging investment in the next generation of research tools" (quoting FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 3, at 20 (2003), http://www.ftc.gov/os/2003/10/innovationrpt.pdf [hereinafter FTC REPORT])).

169. *See* FTC REPORT, *supra* note 168, ch. 3, at 19 (explaining that, with gene chip arrays, "what used to take a post-doc[toral student] in the laboratory approximately six months with proper front-end research can now be done in 20 minutes"); CYNTHIA ROBBINS-ROTH, FROM ALCHEMY TO IPO: THE BUSINESS OF BIOTECHNOLOGY 48–56 (2000) (describing how monoclonal antibodies have improved drug development); Burk & Lemley, *supra* note 2, at 1583 (noting that research tools such as "bioinformatics databases and . . . mass-production techniques like polymerase chain reaction (PCR)" have made "the development of related therapies much cheaper and quicker").

170. Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 208 (2005) (quoting United States Amicus Brief, *supra* note 126, at 23).

171. *See, e.g.*, Richard J. Findlay, *Originator Drug Development*, 54 FOOD & DRUG L.J. 227, 227 (1999) (describing generally the discovery and development of new, or originator, drugs, including the regulatory process with the FDA).

172. Brief of Amici Curiae Eli Lilly & Co. et al. in Support of Petitioner at 5, *Merck*, 545 U.S. 193 (No. 03-1237) [hereinafter Eli Lilly Amicus Brief].

which may present safety concerns.[173] The regulatory stage involves all dealings with the FDA in order to get a compound approved.

The development and regulatory stages both involve gathering information for submission to the FDA. It is fairly clear that there is a reasonable basis for believing that experiments during these stages will produce information that may be submitted to the FDA. Thus, under the broad *Merck* construction, the use of research tools during these stages would qualify for the exemption.

The discovery stage is further removed from FDA submission than later stages. Many experiments conducted during the discovery stage do not involve submitting information to the FDA, but rather constitute "basic scientific research" that does not trigger the § 271(e)(1) exemption.[174] However, researchers conduct all discovery-phase experiments to find an approvable drug.[175] In fact, the FDA has allowed submission of information obtained during the discovery stage in certain situations, such as where researchers had developed compounds for a particularly serious disease[176] or where a compound might be particularly effective.[177] Therefore, even in the discovery stage, many uses of research tools are reasonably related to the development and submission of information to the FDA.

In *Merck*, the Supreme Court arguably authorizes any activity that a drug manufacturer might engage in, so long as there is a reasonable basis for believing the use *might* result in a submission to the FDA.[178] Thus, including biotech research

173. *Id.* at 6 (describing the use of assays to analyze multiple compounds looking for a "hit" and to weed out failed compounds, as well as the use of safety tests regarding "counter-targets" that the drug should not affect).

174. *Merck*, 545 U.S. at 205–06 (noting that "basic scientific research" does not fall under the § 271(e)(1) exemption).

175. *See* Eli Lilly Amicus Brief, *supra* note 172, at 5.

176. *See* United States Amicus Brief, *supra* note 126, at 10 ("[The] FDA might allow clinical testing of a drug that posed significant safety concerns if the drug had a sufficiently positive potential to address a serious disease . . . .").

177. *Id.* ("At the [investigational new drug application] stage, FDA also considers pre-clinical studies related to the effectiveness of a drug in determining whether clinical trials would pose an 'unreasonable risk' to the safety of participants in the trials.").

178. *See Merck*, 545 U.S. at 207 ("[W]here a drugmaker has a reasonable basis for believing that a patented compound may work . . . and uses the compound in research that, *if successful*, would be appropriate to include in a submission to the FDA, that use is reasonably related to the development and

tools under the § 271(e)(1) exemption would exempt nearly every use of biotech research tools, even during the discovery stage. While this massive exemption of biotech tool use probably will not "swallow the whole benefit of the Patent Act"[179] for research tools, as the Federal Circuit feared, it will severely reduce the potential economic benefit associated with inventing biotechnology research tools. The patent system promotes innovation by providing an incentive for inventors to invest in research and development.[180] Patents also promote progress by encouraging inventors to disclose publicly their inventions in exchange for a limited exclusive monopoly, rather than keep them secret.[181]

Because many of these research tools are used almost exclusively for pharmaceutical research,[182] courts that include research tools under the § 271(e)(1) exemption will remove most uses of research tools from infringement and thus will eliminate the economic benefit for research tool patentees. Without this economic benefit, there is much less incentive for researchers to continue developing research tools[183] or for investors to

submission of information . . . ." (emphasis added) (internal citations omitted)). *But see* Brief for Petitioner at 43, *Merck*, 545 U.S. 193 (No. 03-1237) (arguing that use of a research tool, even to develop information that is clearly for FDA approval, "is not 'reasonably related' . . . where equivalent data about the drug or the disease in question could easily be developed through other means," i.e., using other research tools).

179. Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 867 (Fed. Cir. 2003), *vacated and remanded*, 545 U.S. 193 (2005).

180. *See, e.g.*, Rebecca S. Eisenberg, *Patents and the Progress of Science*, 56 U. CHI. L. REV. 1017, 1024–25 (1989) (describing the belief that the patent system strives to allow inventors to extract a higher value from their inventions than they would in a free market system). *But cf., e.g.*, F.M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 660 (3d ed. 1990) ("What is needed for rapid technical progress is a subtle blend of competition and monopoly, with more emphasis in general on the former than the latter . . . .").

181. Eisenberg, *supra* note 180, at 1029–30 (noting that the patent system helps solve the problem of secrecy, which impedes the sale of inventions "because it is difficult to persuade someone to pay for an idea without disclosing it, yet once the invention is disclosed, the inventor has nothing left to sell," whereas patents allow "inventors [to] disclose their patented inventions to potential users without losing their exclusive rights").

182. *See, e.g.*, Vaccinex Amicus Brief, *supra* note 2, at 8 ("[T]he research tools used in the identification, characterization and optimization of therapeutic antibodies have minimal to no use outside of the development of new drugs.").

183. *See* Eisenberg, *supra* note 180, at 1074 (arguing that patent incentives are undermined "when the researcher is an ordinary consumer of an invention with a primary or at least significant market among research users").

provide the necessary capital to finance that development.[184] Without the incentive that patents bring, researchers may well prefer to protect their research tools as trade secrets, "thereby curtailing knowledge of scientific advances" and causing a "reduction in the dissemination of scientific information."[185]

One policy counterargument that disfavors biotechnology patents, including those covering research tools, is based on the so-called "anticommons problem."[186] The anticommons theory posits that when multiple inventions are required to conduct a particular activity, the transaction costs associated with negotiating and obtaining licenses to the patented technologies can prevent or greatly delay the activity.[187] In the context of research tools, the fear is that too many patents on basic tools will impede development of drugs and other downstream products because the "transaction costs involved with acquisition of all necessary research tools may be so severe as to impede, postpone, or stop the development of important new products."[188]

While these fears are understandable, providing a blanket exemption for nearly all uses of research tools is not a viable solution. *First*, it is unclear if there is an extensive anticommons problem with respect to research tools.[189] Many firms that create research tools do so as their end product. These "tool companies" derive revenue by licensing their tool technology, and therefore they have an incentive to reduce transaction costs to avoid a loss of revenue.[190] *Second*, there is no indication that

184. *See* Vaccinex Amicus Brief, *supra* note 2, at 9 ("Private funding is driven by the ability to obtain intellectual property protection.").

185. Brief of Amici Curiae Wisconsin Alumni Research Foundation et al. in Support of Respondents at 21, Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193 (2005) (No. 03-1237).

186. Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698, 698–99 (1998) (defining the anticommons problem in biomedical research).

187. *See* Burk & Lemley, *supra* note 2, at 1611.

188. Mueller, *supra* note 11, at 7.

189. *See* Tanuja V. Garde, *Supporting Innovation in Targeted Treatments: Licenses of Right to NIH-Funded Research Tools*, 11 MICH. TELECOMM. & TECH. L. REV. 249, 269 (2005) (citing a study wherein none of the respondents to the study had had any significant projects stopped because of being denied access to research tools).

190. *Cf.* Vaccinex Amicus Brief, *supra* note 2, at 10–11 (describing the motivations of tool companies and noting that companies that "blocked others from using their platform tool technology by refusing to grant licenses . . . would only be hurting themselves"); Eisenberg, *supra* note 180, at 1074 (noting that when patentees see researchers as potential customers they will

Congress was looking to solve, or had even considered, anti-commons problems associated with research tools when it crafted § 271(e)(1). It would be improper to use hypothetical problems associated with research tool patents—problems that may never occur—to read a congressional intent into § 271(e)(1) that does not exist.

Finally, any problems associated with research tool patents are better solved with solutions other than a blanket exemption for nearly all uses of research tools. Several commentators have proposed that modifying the common law research exception may offer a solution to the potential anticommons problem. Professor Eisenberg has suggested limiting the patentee's ability to enjoin researchers from using the invention[191] while still ensuring the patentee is adequately compensated by requiring payment of a reasonable royalty.[192] Professor Mueller proposes a similar approach that would allow researchers to use research tools while providing an ex post royalty payment, or "reach-through" royalty, that would be based on the value of new products developed through use of the patented research tool.[193] Each of these proposals provides a measured solution that considers the interest of research tool patentees, researchers, and society. In contrast, an across-the-board exemption provides no such balance.

CONCLUSION

Congress enacted 35 U.S.C. § 271(e)(1) to provide an exemption for uses of patented products directed toward submitting information to the FDA. Research tool use is "reasonably related" to this information submission, as required by § 271(e)(1). But, the "patented inventions" referred to in § 271(e)(1) refer to inventions that are themselves subject to FDA regulation. Because research tools are not incorporated into the final product submitted to FDA, they are not subject to FDA regulation and therefore are not "patented inventions" under § 271(e)(1). Consequently, research tools do not qualify for the § 271(e)(1) exemption. Moreover, it is against established policy to exempt research tools under § 271(e)(1) because

"want to extend licenses to them in order to extract the full value of the patent monopoly").

191. Eisenberg, *supra* note 180, at 1076.

192. *Id.* at 1077.

193. Mueller, *supra* note 11, at 54–55.

doing so would remove most of the incentive to innovate in the biotechnology research tool field. Congress never analyzed this effect, and therefore did not authorize this abrogation of research tool patentee property rights.