

Texas Intellectual Property Law Journal
Winter, 2005

Article

THE PATENT RESEARCH TOOL PROBLEM AFTER MERCK V. INTEGRA

Marlan D. Walker^{ast}

Copyright (c) 2005 State Bar of Texas, Intellectual Property Law Section; Marlan D. Walker

Table of Contents

INTRODUCTION	2
I. PART ONE: THE RESEARCH TOOL	4
A. Research Tools: Defined	4
B. Types of Research Tools	5
C. Problems Inherent in Research Tools	7
D. Tool Transfer: University vs. Private Firms	9
1. University Considerations	9
2. Private Firm Considerations	13
II. PART TWO: THE RESEARCH TOOL PATENT PROBLEM OF § 271(e)(1)	16
A. History of the Safe Harbor	17
1. Pharmaceuticals Before Hatch-Waxman	17
2. The Drug Price Competition and Patent Term Restoration Act	19
3. Procedural History	21
4. What did Congress Really Mean? Judicial Interpretations	23
5. Research Exemption versus the Safe Harbor	30
B. Scope of § 271(e)(1) With Respect to Research Tools	31
1. Policy Considerations Under § 271(e)(1)	32
2. Making Sense of the Interpretations of § 271(e)(1)	34

	3. Where Patented Research Tools Fit	39
III.	PART THREE: SOLUTIONS	47
	A. Solutions Related to the Bolar Amendment	47
	1. Judicial Treatment	47
	2. Congressional Intervention	49
	B. Legislative Proposals Relating to Research Tools	51
	1. Proposal: Limited Research Exemption	51
	2. Proposal: Fair Use for Patent Law	52
	3. Proposal: Experimentation Exemption with Compulsory Licensing	53
	4. Proposal: Non-commercial Use Research Exemption	54
	C. The Outlook for Research Tools	54
	1. Positive Effects of Greater Predictability for Research Tools	55
	2. Negative Effects of Stronger Patent Protection for Research Tools	56
	CONCLUSION	57

*2 INTRODUCTION

The Supreme Court recently decided *Merck KGaA v. Integra Lifesciences I, Ltd.*, which addressed the role of research tools in the development of drugs and medical devices.¹ Because the problems involving research tools are relatively new to the research community, they are only now beginning to be litigated. The Supreme Court accepted certiorari in *Integra* to decide the scope of the safe harbor established by § 271(e)(1)² as applied to experimentation on research compounds as potential drugs. Although the parties did not specifically argue the case from the perspective of research tools, both the Federal Circuit and the Supreme Court briefly discussed the growing problem of research tools in dicta. Specifically, the courts addressed the issue of whether research tools fit into the rubric Congress created in the Hatch-Waxman Act.

In the last two decades, the biotechnology industry has boomed. The reason for the growth of this industry is, in part, due to the discovery of recombinant DNA techniques and the invention of other research tools allowing for manipulation and study of the genome, proteins, and biological pathways. However, because the industry is so research tool intensive, numerous problems have arisen stemming from the competing interests of the many players in the biotechnology field, including universities and other non-profit entities, private research firms, private tool innovators,³ and the pharmaceutical industry. Moreover, research tools are extremely varied, ranging from broad spectrum tools with wide ranging applications to very specific tools with limited applications. In addition to these problems, Congress may have inadvertently created a loophole in § 271(e)(1), allowing for virtually unlimited use of research tools without the attendant obligation to obtain a license in certain situations.

In 1984, Congress passed the Hatch-Waxman Act, also known as the Drug Price Competition and Patent Term Restoration Act of 1984.³ Hatch-Waxman was a carefully negotiated act, designed with incentives to bring cheap, generic drugs to market when the patent on the pioneer drug expired, while preserving the incentives for research and development of new drugs to the pioneer drug manufacturers. Prior to Hatch-Waxman, generic drug manufacturers submitted New Drug Applications (NDA) to the FDA before they could market the drug. The approval process took five to seven years, and tests could not

begin until the relevant drug patents expired. Under those conditions, bringing most generic drugs to market was not cost-effective. Thus, because of a lack of competition the public suffered from artificially high drug prices post-patent.

Hatch-Waxman solved the problems preventing generic drugs from entering the market by substituting for the NDA requirement an Abbreviated New Drug Application (ANDA) requirement, which required the generic manufacturer only to show bioequivalency,⁴ reducing the approval time to one to two years. Additionally, Congress created a safe harbor from infringement, § 271(e)(1), that allows generic manufacturers to develop data for their ANDA prior to the expiration of the patent on the pioneer drug. The pioneer drug manufacturers, in turn, receive a term extension to make up for market exclusivity lost to the FDA approval process, allowing them to recoup more of the research and development costs during the life of the patent.

*4 In theory, the principles embodied by Hatch-Waxman are a boon to the public. However, despite Congress's seemingly clear goals, poor drafting of § 271(e)(1) left the safe harbor open to unintended consequences. One such consequence is the preempting of patented research tools from infringement when they are used to develop and submit information pursuant to FDA approval of a new drug or device. Such was the core issue in *Integra* and is very likely to be litigated increasingly often as research tools take an increasingly prominent role in research and development activities.

This paper will explore the issues related to research tools, including the difficult issues posed by research tools and how they fit into the statutory scheme of the Hatch-Waxman Act and § 271(e)(1), in light of the Supreme Court's decision in *Integra* and relevant Federal Circuit decisions. Part One introduces research tools and their more general problems. Part Two discusses the legislative history and case law surrounding the safe harbor. Also included is an analysis of the research tool problem within the context of the principles, language, and case law. Finally, Part Three discusses possible solutions for the problems inherent in research tools.

I. PART ONE: THE RESEARCH TOOL

A. Research Tools: Defined

Patented research tools are ubiquitous in the pharmaceutical industry.⁵ They save valuable time and money for researchers.⁶ Over the last twenty years, the biotechnology industry has boomed,⁷ and research tools now form the core of much of the pharmaceutical research, development, and testing done today.⁸ Such inventions include patented assays and procedures; patented cell lines; patented recombinant DNA constructs and methods; enzymes; DNA microarrays for high throughput drug screening; patented research animals; bioinformatic tools such as computer programs; DNA, protein, and combinatorial chemistry libraries; reagents; drugs and drug targets; and many other patented machines and apparatuses.⁹ Pharmaceutical *5 manufacturers and other biotechnology companies rely on patented research tools to save time and money. Under 35 U.S.C. § 271(e)(1), it may be possible for pharmaceutical manufacturers submitting applications for new, patented drugs, to take advantage of the safe harbor, whereas the safe harbor was clearly included in Hatch-Waxman as part of a quid pro quo for the benefit of generic drug manufacturers, not the makers of new drugs.¹⁰

According to the National Institutes of Health (NIH), research tools are “the full range of resources that scientists use in the laboratory.”¹¹ However, the actual definition of a research tool is difficult to pin down and often depends on one's point of view. Some inventors create research tools incidentally as a means to achieve their research goals.¹² Other inventors view research tools as “end products.” In many cases, these other inventors invest considerable amounts of time and money in the development of their tools with an end goal to profit.¹³

Research tools are unlike other patented inventions with respect to the difference between the various consumers of the tool and the provider of the research tool.¹⁴ The NIH aptly reported, “[w]hat a user sees as a research tool, a provider may see as a valuable end product for sale to consumers.”¹⁵ To scientists, however, the use of research tools should be freely available as necessary to promote the useful arts and sciences.¹⁶ These conflicting perspectives illustrate the difficult issues raised by research tools.

B. Types of Research Tools

There is little dispute that research tools are set apart from mainstream patentable subject matter. In many cases, a research

tool is hard to distinguish from natural phenomena. For example, genes or cell lines are considered research tools, *6 but are often merely discoveries made in the lab after trial and error.¹⁷ Research tools can generally be subdivided between specialized research tools and broad spectrum research tools.¹⁸ Specialized research tools tend to have very limited application. They include genes, cell lines, therapeutic compounds, and other known biologics involved in disease pathways that are yet to be understood.¹⁹ Broad spectrum research tools “include new techniques, databases, instruments and reagents, [that] are useful in pursuing a wide range of research problems.”²⁰ These tools are not incidental to the accomplishment of research goals, but are themselves the direct goal of research and development. Thus, they are expensive to develop.²¹ Moreover, they generally have a broad potential market.²²

Broad spectrum tools are consequently marketed in various ways. Like other patented inventions, many inventors of broad spectrum research tools attempt to maximize profits by charging a high price of a large up-front sum, royalties and reach-through royalties, or a combination of these for use of the tool.²³ The problem with attempts to charge a high premium is that many of the potential customers, including nonprofit and small research entities, which include universities, are often unable to afford the premium.²⁴

Conversely, another strategy is to charge a relatively small yearly subscription fee for the technology, with the hope that it will be widely disseminated.²⁵ The most prominent example of this strategy is the Cohen-Boyer patents that formed the basis of recombinant DNA research.²⁶ Under the Cohen-Boyer patents, a license required \$10,000 upfront and an additional yearly fee of \$10,000.²⁷ However, the *7 success of the Cohen-Boyer licensing stemmed, in part, from its ease of use and the fact that it was the only known technique to conduct recombinant DNA research.²⁸

Comparing the marketing strategy employed by the Cohen-Boyer patents to the strategy originally employed by Cetus in its license scheme for the Polymerase Chain Reaction (PCR) proves interesting.²⁹ Recognizing the necessity of PCR to the field of molecular biology, Cetus attempted to impose reach-through royalties on all downstream commercial ventures that used PCR.³⁰ Consequently, the price of the license caused many members of the scientific community to threaten a boycott of PCR.³¹ Both the Cohen-Boyer strategy and the PCR strategy reaped tremendous profits. However, the example also shows that even scientists will not be held hostage in order to progress their research. Nevertheless, this example illustrates one of the difficult problems that research tools pose. That is, if the Constitution grants patents to “promote the useful arts,”³² should inventors of research tools be able to essentially corner the progress of research by holding out on the transfer of technologies crucial to the development and progress of science?

C. Problems Inherent in Research Tools

Research tools pose unique problems from the perspective of public policy. In addition to potentially restricting the flow of science, some schools of thought do not consider research tools as patentable subject matter. Other problems arise from the interaction between private suppliers and users of research tools on one hand, and not-for-profit, budget-conscious institutions, such as universities, on the other hand. These problems generally stem from the variation in the perceived value of the research tools.

The interaction between private entities and not-for-profit institutions is particularly difficult because the research goals of each respective party are motivated in different ways.³³ The private firms, naturally, are profit motivated. Thus, when they supply the research tool, they seek to maximize profits. Likewise, the aim of their research is also profit motivated. Consequently, their research and development is geared for commercial exploitation. This causes research tool providers to attempt to leverage their tools in order to collect royalties not only on the tools, but *8 also on downstream inventions.³⁴ Ironically, when universities attempt to leverage their research tools, private entities object, especially where the development of the research tool was sponsored using federal funds.³⁵

On the other hand, the goal of non-profit research is to further the knowledge of mankind.³⁶ Non-profit research is often sponsored by the government or other charitable entities and consequently has limited budgets. This results in a more budget-conscious mindset, which often makes the acquisition of a research tool impossible, especially where the tool owner is trying to leverage the tool to maximize potential profits. Nevertheless, when non-profit entities are the source of the tool, as opposed to the users, they act just as “unscrupulously” as members of private industry. Like private industry, they seek to maximize their profits on the research tool by charging costly premiums to users. This leaves many private firms frustrated by the double standard.³⁷ Nevertheless, these sorts of behaviors may stem from the tendency of research tool owners to overestimate the value of the tools.

The reason why inventors of research tools tend to overestimate the value of their tools is difficult to ascertain.³⁸ This phenomenon may result partly from the differences in the perception of the tools' value between the suppliers, who are more likely to view their tools as an end product, and the end users, who typically view them as a means to an end.³⁹ Additionally, research tool owners may see their tools as the keystone to downstream inventions. Thus, they may feel a right to reap the rewards of commercially successful inventions based on the "but for me . . ." logic, especially when the downstream invention carries an enormous price tag for development or the potential for enormous profits.⁴⁰ Similarly, as previously noted, the reason suppliers may see their invention as more valuable than it is stems from the fact that their invention may make science more efficient and, in some cases, possible.⁴¹

***9 D. Tool Transfer: University vs. Private Firms**

Recently, the NIH published a report describing the difficult dichotomy between private industry and universities regarding research tools.⁴² In the report, the NIH commented on a number of problems arising from the transfer of research tool technology in addition to those already discussed. Because of the Bayh-Dole Act,⁴³ universities tend to wear two hats: one hat is the mortarboard of a university research institution, earnestly seeking to further knowledge through general research activities. However, in the course of those research activities, university researchers often invent research tools as part of the research process. The university then takes off the not-for-profit hat and attempts to transfer the new technology with an end goal of profit.⁴⁴

Conversely, the goal of private firms is profit, which creates friction with universities. Private firms try to impose protracted licensing agreements, ironically, with similar terms that universities try to impose on the private firm, to make use of the research tools.⁴⁵ Budget-conscious universities object to the perceived gouging by private firms. However, they then turn around and behave similarly. The NIH Report relates the general feelings of the dual hats that universities try to wear: [Universities] want it both ways. They want to be commercial institutes when it comes to licensing their technology, but to be academic environments when it comes to accessing technology that other have developed.

. . . .

A related complaint was that it is unfair for universities to charge private firms for access to research tools that they would provide free of charge to academic researchers. Scientists in private firms feel that they should be no less entitled than their university counterparts to put the tools created through NIH-funded research to work in their own laboratories.⁴⁶ The undercurrent of these problems stems from the licensing and material transfer agreements (MTA) that must be executed prior to transfer of the technology.

1. University Considerations

i) Administrative Problems

As cited by the NIH Report with respect to the transfer of research tool technology, the burden on the university administration to negotiate and approve licenses *10 and MTAs delays the dissemination of research tools into university laboratories. The delays arise mainly due to slow-moving administrative processes, which require universities to review and approve each agreement. This is problematic for universities because they often lack the manpower to negotiate and review the volume of agreements coming into and out of their technology transfer offices.⁴⁷ For example, the University of Pennsylvania reported that in 1997 the number of MTAs needing review increased 115%.⁴⁸ Likewise, in the late 1990s, the University of Washington technology transfer office negotiated around 1000 incoming MTAs, each of which can take longer to negotiate than a "comprehensive research sponsorship agreement."⁴⁹ It only stands to reason that the number of agreements increased in the half decade since the NIH released its reports, further exacerbating the problem.

ii) Publication and Presentation of Tool-Aided Research

In addition to the administrative obstacles in procuring research tools, the terms of the agreements also pose difficult problems from a university's perspective. For starters, confidentiality terms in these agreements often interfere with

publication and presentation of the subject matter in journals and at conferences.⁵⁰ In the case of research tools, confidentiality prevents presentation of results, even where the results are not aimed at any commercial venture. In some cases, the confidentiality term is somewhat relaxed to require approval of subject matter prior to publication of results.⁵¹ The end result of this type of process is a downstream leveraging of research and development by the holder of a research tool. This arrangement potentially creates conflicts for researchers who wish to present their findings, but must obtain approval prior to the presentation of discoveries made with the help of a particular research tool.⁵²

iii) Rights to Commercially Viable Downstream Intellectual Property

Even more disturbing is a recent leveraging trend, where tool owners attempt to claim rights in future discoveries as part of the license to use the tool.⁵³ These *11 types of reach-through terms attempt to capitalize in principle on the rights granted by the Bayh-Dole Act, which gives universities the rights to commercialize their discoveries.⁵⁴ Some terms go as far as demanding “outright ownership of future discoveries.”⁵⁵ Other terms seek assignment of materials derived from use of the research tool or royalty-free licenses.⁵⁶ Arguably, with respect to some research tools, such as cloned genes or cell lines, a certain justification exists for these types of agreements because the research tool is eventually “incorporated” into the end product. However, many other types of research tools are not incorporated into the end product; they are more traditionally what one would recognize as “tools.” Demanding that use of such tools should give downstream rights is equivalent to the inventor of the hammer demanding rights to all inventions created using the hammer.⁵⁷

Moreover, agreements granting rights in downstream inventions impact the ability of researchers to secure funding for further projects and may even violate the Bayh-Dole Act.⁵⁸ Many private entities also sponsor research. These entities generally require a right to any commercially valuable end product. Consequently, reach-through provisions demanded by research tool providers may violate these prior agreements.⁵⁹ Likewise, in the case of federally funded research, universities cannot assign ownership of discoveries without violating Bayh-Dole.⁶⁰

Bayh-Dole is essentially the same in principle as private sponsorship. The university enters into an agreement with the federal government that grants the funding agency certain rights arising out of any invention discovered through the use of the federal funds.⁶¹ The NIH Report quoted a university lawyer: “[i]t does not seem reasonable for a materials provider, who simply loaned a material for a *12 specific research project, to acquire greater rights in inventions resulting from that project than would the sponsor which funded the entire project.”⁶²

These types of obstacles to secure the right to use a particular research tool underscore a further source of concern in the research community because, investigators must constantly worry about their next source of funding. When rights to inventions are tied up in agreements to research tool providers, investigators may find it more difficult to get other entities to sponsor future research.⁶³ Moreover, these “tied up” rights may “conflict with the university’s stewardship of its inventions for the public benefit.”⁶⁴ In the end, these concerns make little difference to private entities that may be indifferent to whether they license their tool to the university.⁶⁵

iv) Restricting Uses and Indemnification

Universities must deal with use restrictions and indemnification as part of the terms of potential licenses and MTAs. Some of the typical restricting terms include “prohibit[ions from] sharing materials with other researchers, sending them to other institutions, using them for commercial purposes, [and] using them in research sponsored by another firm.”⁶⁶ Other provisions are designed only to prohibit use of the tools for commercial ventures.⁶⁷ But this becomes problematic when the lab incidentally develops a commercially valuable commodity that cannot be commercialized because of its commercial nature.

Many agreements also contain indemnification provisions requiring the university to insulate the research tool provider from any liability arising from the use of the tools.⁶⁸ Most universities prefer not to risk their endowments for research tools and attempt to negotiate provisions that make each party liable for its own negligence or provisions that provide indemnity only for willful breach of safety provisions contained in the agreement.⁶⁹

***13 v) Commercialization of University Tools**

As previously mentioned, universities practice a double standard when importing research tools versus exporting them. When

universities are the providers of research tools, they attempt to impose many of the same types of clauses they object to in incoming licenses and MTAs.⁷⁰ Naturally, this sort of double standard on the part of universities only aggravates perceived problems with respect to the transfer of research tools.⁷¹ Moreover, universities often treat private industry different from other not-for-profit research institutions with respect to terms imposed in the transfer of their tools, creating a perception of unfairness among the private firms.⁷² The fact that many of the research tools at issue are invented using federal funds leaves many of the private entities crying foul.⁷³ Moreover, because universities move so slowly on these sorts of agreements, many private entities cannot get rights to use the tools in a reasonable amount of time, which precludes many deals.⁷⁴

2. Private Firm Considerations

i) Pros and Cons

Unlike university technology transfer offices, private entities usually transfer tools when it is profitable. Nevertheless, many private entities value research tool transfer even when the transfer of the tool itself is not profitable.⁷⁵ Many private entities do not directly develop tools out of their research and development programs. When they do, they are often apt to transfer the tools, even to competitors, *14 at a reduced “price” under the principle of “what goes around, comes around.”⁷⁶ Not only are these companies motivated by a “social responsibility,” but the negotiations involved in the technology transfer are simply too protracted and complex to make transfer of limited tools profitable.⁷⁷ Moreover, many of these firms now depend on academic research to further their more profitable interests, making a good relationship with academia more important than short term profits on their research tools.⁷⁸ Finally, private companies often acquire commercially viable academic discoveries, making a good relationship with academia that much more important.

However, a private firm’s willingness to share its research tools turns, in part, on how the firm classifies the tools. Indeed, firms that simply classify their research tools as “tools” are more readily inclined to transfer those tools within the scientific community for little or no profit. On the other hand, private firms that consider their tools to be end products are less likely to be benevolent in the terms they impose in the transfer of their tools. These firms worry that their research tools will be used by competitors to their detriment.⁷⁹ Additionally, private entities are unlikely to sanction the use of tools that competes with its own research goals.⁸⁰ Lastly, private firms worry about university research scientists, who are often oblivious to the terms imposed on the use of the research tools and may inadvertently leak the tools to competitors.⁸¹

ii) Types of Research Tools: Strategies

As just discussed, all research tools are not alike. Consequently, the strategies with which they are transferred vary depending on the type of research tool. The NIH suggests that differences in strategies vary among three general classes of research tools: therapeutic compounds,⁸² compounds that are potential targets for drugs,⁸³ and broad spectrum research tools.⁸⁴

*15 Therapeutic compounds are often not classified as research tools because of their potential to be turned into drugs. The potential windfall that accompanies development of these sorts of tools forces the tool owners to make their transfer agreements quite restrictive.⁸⁵ Because the private firms that transfer these tools are generally not interested in furthering the science when potential drugs are at stake, the agreements often contain confidentiality clauses. Moreover, private entities risk allowing other researchers to discover new uses or indications for the compound that “block the firm from fully developing its own product.”⁸⁶ Nevertheless, some firms have actually started to donate these tools to non-profit pharmaceutical companies to develop for the common good.⁸⁷

Closely related to the therapeutic compounds are the “molecule[s] . . . play [ing] . . . role[s] in disease pathways that [are] not yet fully understood.”⁸⁸ These molecules are expensive to discover, which makes companies reticent to give others carte blanche with respect to the discovery of potentially valuable uses for the compounds.⁸⁹

Finally, broad spectrum research tools present their own problems. This is the class of research tools that is most likely to be considered an end product. Not only are these tools useful for a wide range of problems, but they are often expensive to develop. Additionally, because of their wide-range applicability to varied problems, there are many potential users. Thus, these tools are often the ones with the highest price tags.⁹⁰ While the specialized tools such as the therapeutic compounds may have more restrictions, they may also be cheaper because there are fewer parties interested in using them.⁹¹ In addition to potentially high prices for these sorts of tools, companies use these tools to attempt to leverage downstream inventions with

reach-through provisions and other licensing techniques to maximize profits on the tool, as previously discussed.⁹²

***16 II. PART TWO: THE RESEARCH TOOL PATENT PROBLEM OF § 271(e)(1)**

When Congress passed the Hatch-Waxman Act, there was no way to anticipate the research tool patent problem. The problem arose from the combination of three factors. First, Congress did a poor job drafting § 271(e)(1). Second, biotechnology, still in its infancy in 1984, has grown tremendously. Third, the importance of intellectual property is more prominent today than in 1984.

Congress did a poor job drafting § 271(e)(1). Justice Scalia stated, “No interpretation we have been able to imagine can transform § 271(e)(1) into an elegant piece of statutory draftsmanship.”⁹³ Section 271(e)(1) reads:

It shall not be an act of infringement to make, use, offer to sell, or sell within 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 . . .⁹⁴ Congress wrote few restrictions into the language “patented invention.” In 1988, it amended the scope slightly to exclude certain animal drugs and veterinary biological products created using biotechnology tools.⁹⁵

The term “patented invention” applies to any patented invention that can qualify under the “reasonably related” standard. Congress restricted the application of § 271(e)(1) to uses “reasonably related” to submission for FDA approval under federal laws that regulate drugs, but gave no additional guidance as to whether the federal laws referred to were a statutory scheme regulating drugs, such as the Food, Drug, and Cosmetic Act,⁹⁶ or specific sections of federal statutes relating to drugs. As viewed in its plainest language, § 271(e)(1) applies to any patented invention used to develop and submit information pursuant to FDA approval. Thus, Congress inadvertently created the research tool patent problem.

The research tool patent problem is increasingly troublesome in an era where the value of intellectual property takes increasing prominence in companies’ portfolios.⁹⁷ In 1984, the potential interference to the rights of research tools patents posed by § 271(e)(1) likely did not affect the value of the patent. Since 1984, many new inventions can be directly used to develop information pursuant to FDA approval *17 of drugs and devices.⁹⁸ The impact resulting from the rapid growth of biotechnology tools may no longer be easily written off as *de minimis*. Patent holders are more aware today of the value of their patents, and they are not eager to forego remuneration of the use of their patents by deep pockets, especially those of the pharmaceutical industry.

In order to appreciate the various facets of the research tool patent problem, one must look first to the legislative history and case law in order to make sense of whether research tools should qualify under the safe harbor of § 271(e)(1).

A. History of the Safe Harbor

1. Pharmaceuticals Before Hatch-Waxman

i) The Pre-Hatch-Waxman Pharmaceutical Market

Prior to the passage of the Hatch-Waxman Act, pioneer drugs dominated the marketplace. The pioneer drugs enjoyed seventeen years of exclusivity by virtue of their patents. Additionally, FDA regulations both hurt and helped the period of market exclusivity for pioneer drugs. On one hand, safety and efficacy testing took a pharmaceutical manufacturer from five to ten years to complete. Until the manufacturer completed this testing, the FDA would not approve their New Drug Application (NDA). During the time taken to complete the FDA approval process for an NDA, the useful life of a patent continued to diminish.⁹⁹ Thus, it took anywhere from seven to ten years after the issuance of the patent before it could be marketed and sold publicly, reducing the useful patent life on the drug accordingly. In 1984, a novel drug therefore enjoyed around seven to ten years of market exclusivity.¹⁰⁰

On the other hand, prior to the passage of Hatch-Waxman, novel drugs often recovered the market exclusivity lost in the approval process. In most cases, while the generic drug awaited approval for its NDA, the pioneer drug enjoyed a *de facto* term extension.¹⁰¹ In effect, the novel drug manufacturer recovered an equivalent exclusivity period for time lost during the

new drug approval process.

Although there were a handful of generic drug manufacturers before the passage of Hatch-Waxman, the NDA requirement on a generic version of a drug made *18 it difficult for generic pharmaceutical manufacturers to successfully bring a generic drug to market. Because of the cost of an NDA and the length of time necessary to prove safety and efficacy of the generic version of the drug, bringing generic versions to market was, in most cases, cost-prohibitive.¹⁰² In fact, in 1984, there were 150 commercially viable, unpatented drugs without a generic counterpart.¹⁰³ Today, nearly three-quarters of drugs listed in the FDA Orange Book have a generic counterpart, which accounted for over 50% of all prescriptions distributed in the United States.¹⁰⁴

ii) The Public Loses Pre-Hatch-Waxman.

The public suffered the greatest harm arising from the drug market prior to the passage of the Hatch-Waxman Act. The government, and thus taxpayers, bought large numbers of drugs under prescription plans for government employees and military personnel. Because of the lack of serious competition in the marketplace, drugs were more expensive across the board, even in instances where generic drugs were available.¹⁰⁵ The higher costs associated with drugs prior to passage of the Hatch-Waxman Act cost the public more in taxes, more in insurance premiums, and more for the drugs themselves.

Congress estimated tremendous savings to both the government and the public as a result of the Hatch-Waxman Act. One estimate suggested that consumers would save over one billion dollars by making generic drugs more accessible.¹⁰⁶ For example, in 1984 government prescription plans saved 1.2 million dollars per year buying generic metronidazole.¹⁰⁷ Indeed, Congress estimated a savings of 50% over the cost of brand name drugs if they could make generic versions of the drugs more accessible.¹⁰⁸ Congress designed the Hatch-Waxman Act to provide incentives for generic drug manufacturers to bring more generic drugs to market, which in turn benefited the pocket books of consumers and saved the government millions of dollars per year.

***19 2. The Drug Price Competition and Patent Term Restoration Act**

In 1984 Congress enacted the Drug Price Competition and Patent Term Restoration Act, known more commonly as the Hatch-Waxman Act.¹⁰⁹ The Hatch-Waxman Act is a broad compromise between the pioneer pharmaceutical companies, generic pharmaceutical companies, and the public.¹¹⁰ Pioneer pharmaceutical companies got a statutory patent term extension for up to five years in order to restore market exclusivity lost to the FDA approval process.¹¹¹ Generic drug companies benefited from the Hatch-Waxman Act in the form of a major revision to the Food, Drug, and Cosmetic Act (FDCA).¹¹² Instead of requiring an NDA for generic versions of previously approved drugs, Congress made the Abbreviated New Drug Application (ANDA) process available to generic manufacturers,¹¹³ which was available only to drugs approved by the FDA prior to 1962, and thus prior to the Hatch-Waxman Act.¹¹⁴ Generic drug companies also benefited from the inclusion of the Bolar Amendment, which provided a safe harbor for otherwise infringing activities pursuant to FDA approval of generic drugs.¹¹⁵

In April of 1984, the Federal Circuit decided *Roche Products, Inc. v. Bolar Pharmaceutical Co.*¹¹⁶ Roche held that a generic drug manufacturer's testing of generic versions of patented drugs infringed the patents of pioneer drugs. The court held that Bolar's activities infringed because they were not protected by the common law research exemption, and were not de minimis uses of the patent.¹¹⁷ From the perspective of the pioneer pharmaceutical companies, Roche reinforced the novel drug's de facto term extension while the generic drug equivalents awaited FDA approval of their NDA.¹¹⁸

*20 The House of Representatives responded to Roche as a natural extension of the principles embodied in the Hatch-Waxman Act.¹¹⁹ As part of the Hatch-Waxman Act's benefit to generic drug companies, they received an exemption from patent infringement on the novel drug counterpart, provided that the use of the patent developed information that would reasonably lead to pre-expiration FDA approval of a generic version of a drug.¹²⁰ This facilitated availability of generic drugs immediately upon the expiration of the patent on the pioneer drug.

In light of the changes to the patent statute, the Hatch-Waxman Act also modified the FDCA to give pioneer drug companies the ability to resolve patent disputes prior to the generic entry into the market.¹²¹ The Hatch-Waxman Act included a provision, which requires pioneer drug companies to submit patent information on novel drugs to the FDA.¹²² The FDA lists these patents in a publication entitled "Approved Drug Products with Therapeutic Equivalence Evaluations," commonly

known as the “Orange Book.”¹²³ Generic manufacturers, in addition to their ANDA, must certify the patents listed in the Orange Book upon which they rely in order to show bioequivalency.¹²⁴

Finally, the Hatch-Waxman Act benefited the public through increased competition in the marketplace, which resulted in lower consumer costs for drugs and insurance. Additionally, generic drugs were available immediately upon expiration of the relevant patents. Indeed, the Hatch-Waxman Act effectively removed barriers to generic drugs in the marketplace, while still retaining sufficient incentives to pioneer drug manufacturers to develop new and useful drugs.

***21 3. Procedural History**

i) House of Representatives

The Senate introduced and passed the bill that became the Hatch-Waxman Act with little resistance.¹²⁵ The majority of resistance to the bill was in the House of Representatives.¹²⁶ Perceived to weigh in favor of the pioneer pharmaceutical industry, Representative Waxman went to the pharmaceutical companies and negotiated a bill that benefited all parties.¹²⁷ Representative Waxman negotiated § 271(e)(1) as part of the benefit to generic drug manufacturers and the public.¹²⁸

Those in opposition to § 202 (codified as 35 U.S.C. § 271(e)(1)) of H.R. 3605 introduced amendments that attempted to push the bill more in favor of the pioneer pharmaceutical companies.¹²⁹ However, most of the amendments that disturbed the “negotiated” balance of the bill failed to make it out of the Judiciary Committee.¹³⁰ Representatives Moorehead’s and Kindness’s amendments were relevant to the safe harbor of § 271(e)(1).¹³¹

***22** The amendment proposed by Representative Moorehead attempted to restrict the otherwise infringing activities to the last year of the patent term extension.¹³² Representative Moorehead argued that the Constitution guaranteed a right of patent exclusivity, and thus § 271(e)(1) was unconstitutional.¹³³ He suggested that because the term extension was a statutorily granted term, rather than a constitutionally guaranteed term, that otherwise infringing activities during the term extension fell outside the purview of the Constitution. The House Judiciary Committee viewed otherwise infringing activities as de minimis interference on the rights of the patent holder and served a more important public purpose of making generic drugs more readily available to the public.¹³⁴

Representative Kindness introduced the same amendment during debate on the House floor.¹³⁵ In an interesting twist, Representative Kindness tried to tie term extension to the infringement exemption embodied in § 271(e)(1).¹³⁶ In effect, Representative Kindness attempted to codify the issue of symmetry between the term extension of § 156 and the safe harbor of § 271(e)(1). Like the Moorehead Amendment, the House defeated Representative Kindness’s amendment.¹³⁷ The reason the House defeated the amendment is unclear. On one hand, the House may have killed the amendment based on a rejection of the symmetry issue. On the other hand and more plausibly, it may have been the inclusion of essentially the same language included in the Moorehead Amendment that proved fatal.¹³⁸

***23 ii) Passage through the Senate and Presidential Signature**

Hatch-Waxman originated in the Senate.¹³⁹ As originally drafted, it did not include the safe harbor of § 271(e)(1).¹⁴⁰ The Senate ratified the bill with little voiced opposition, and sent it to the House of Representatives where Representative Waxman introduced § 271(e)(1).¹⁴¹ Upon receipt of the amended house bill, Senator Hatch reintroduced the bill to the floor of the Senate. There was some mild opposition to various facets of the bill,¹⁴² but it ultimately passed.

President Ronald Reagan signed the bill into law on September 24, 1984.¹⁴³ President Reagan stated that “[this] legislation will speed up the process of Federal approval of inexpensive generic versions of many brand name drugs, make the generic versions more widely available to consumers, and grant pharmaceutical firms added incentives to develop new drugs.”¹⁴⁴ He stated further that the federal government, as the “largest single consumer of drugs,” would greatly benefit from the lower cost of generic drugs.¹⁴⁵

4. What did Congress Really Mean? Judicial Interpretations

Since the passage of Hatch-Waxman, the courts are consistently inconsistent in their interpretations of § 271(e)(1), thereby

withholding from the legal community a vehicle to predict how problems such as the research tool patent problem should be resolved. Indeed, outcomes in the courts with respect to § 271(e)(1) are unpredictable, with inconsistent holdings and dicta from case to case and court to court, and even opinions, which in light of today's technology, are logically invalid.¹⁴⁶ Until recently, the general trend expanded the scope of the Hatch-Waxman ***24** Act.¹⁴⁷ With respect to the application of § 271(e)(1) to patented research tools, six cases address the topic directly, and all have slightly different applications of § 271(e)(1).

i) Eli Lilly & Co. v. Medtronic, Inc.

The first case addressing the problems arising from § 271(e)(1) was *Eli Lilly & Co. v. Medtronic, Inc.*¹⁴⁸ The Supreme Court grappled with the problem of whether the language of § 271(e)(1) applied to a cardiac defibrillator, a Class III medical device.¹⁴⁹ Like drugs, the FDA requires that Class III medical devices undergo safety and efficacy testing prior to marketing.¹⁵⁰ Although § 271(e)(1) broadly applies to the term “patented invention,” Congress narrowed it with respect to the scope of its applicability by requiring that the use be “reasonably related to the development and submission of information under a federal law which regulates the manufacture, use, or sale of drugs. . . .”¹⁵¹ The Supreme Court held that a Class III medical device was considered a “patented invention” because it met the requirement that it be pursuant to FDA approval under a federal statute regulating drugs.¹⁵²

The Supreme Court came to this conclusion based on the “patented invention” standard. The Court held that the issue turned on the meaning of the term “Federal law” in the statutory language, not the term “drug.”¹⁵³ Justice Scalia wrote for the Court that § 271(e)(1) “more naturally summons up the image of an entire statutory scheme. . . .”¹⁵⁴ Thus, the scope of § 271(e)(1) applies not only to drugs, but potentially to any invention, provided its use is related to a requirement imposed under a federal law related to drugs.¹⁵⁵

***25** The Supreme Court also addressed the “symmetry principle” inherent in the Hatch-Waxman Act. The symmetry principle requires that the “patented invention” of § 271(e)(1) be an invention eligible for term extension under 35 U.S.C. § 156.¹⁵⁶ The Court held that § 156 and § 271(e) are meant “generally to be complementary.”¹⁵⁷ Thus, the Court suggested that if a device is not eligible for term extension, then the safe harbor of § 271(e)(1) should not apply either.¹⁵⁸ Despite the Supreme Court’s good intentions with respect to the so-called symmetry principle, later cases show that symmetry is not compatible with a broad application of the term “patented invention” in § 271(e)(1) that extends the safe harbor to all medical devices, including Class I or Class II medical devices.

ii) Intermedics, Inc. v. Ventritex, Inc.

Intermedics, a Northern District of California case affirmed by the Federal Circuit, addressed the question of intent in the application of § 271(e)(1).¹⁵⁹ Here, the court refused to subjectively consider specific uses for which the § 271(e)(1) exemption was granted.¹⁶⁰ Rather, the court held that Congress intended the test for determining whether § 271(e)(1) applies to be an objective test, “focusing on conduct rather than motive or ultimate aim.”¹⁶¹ To that end, the court set out the relevant factors to test whether a particular use is reasonably related to the pursuit of FDA approval:

[W]ould it have been reasonable, objectively, for [the allegedly infringing] party to believe that there was a decent prospect that the ‘use’ in question would contribute (relatively directly) to the generation of kinds of information that was likely to be relevant in the processes by which the FDA would decide whether to approve the product?¹⁶²

This test allows all patents the benefit of § 271(e)(1), provided the uses are “reasonably related.” Even ancillary uses are permitted if reasonably related to FDA approval under *Intermedics*.¹⁶³

***26 iii) Chartex International PLC v. M.D. Personal Products Corp.**

In *Chartex*, the Federal Circuit held that generic makers of a female condom did not infringe the patent held by *Chartex International PLC*.¹⁶⁴ The generic makers used the female condoms in a variety of uses including exhibition at trade shows, consumer studies, preparation of overseas manufacture of the device, and for personal use. *Chartex* argued that because the female condom was either a Class I or Class II device, it was not entitled to exemption under § 271(e)(1), because it was not

entitled to a term extension. The court stated:

Chartex would read limitations that may apply to 35 U.S.C. [section 156] (1988) into section 271(e)(1). [Section 156], however, deals with term extensions for patents relating to products subject to lengthy regulatory delays. Although section 156 and section 271(e)(1) of title 35 passed Congress as sections 201 and 202 of the Drug Price Competition and Patent Term Restoration Act of 1984, . . . this court declines to read possible limitations from one section into another.¹⁶⁵

iv) AbTox, Inc. v. Exitron Corp.

AbTox extended Eli Lilly to Class I and Class II medical devices.¹⁶⁶ The Federal Circuit resolved the issue of whether medical devices, which were not eligible for term extensions under § 156(a),¹⁶⁷ enjoyed the protection of the safe harbor of § 271(e)(1).¹⁶⁸ The Federal Circuit decided between the two disparate holdings in Eli Lilly: whether § 271(e)(1) applied as part of an entire statutory scheme of regulation, or whether § 271(e)(1) required symmetry.¹⁶⁹ The court noted that the FDA did not require pre-marketing approval for Class I and Class II medical devices.¹⁷⁰ Thus, these devices were not eligible for term extensions under § 156(a).¹⁷¹ The Federal Circuit held, “Ultimately, this court must follow the Supreme Court’s broader holding, which remains in force despite a potential conflict with its own narrower reasoning . . . the Supreme Court commands that statutory symmetry is preferable but not required.”¹⁷² Consequently, under § 271(e)(1), otherwise infringing *27 acts need only be reasonably related to FDA approval to be entitled to the safe harbor.¹⁷³

v) Infigen, Inc. v. Advanced Cell Technology, Inc.

Infigen was a decision that cut against the precedent of the Federal Circuit with respect to § 271(e)(1).¹⁷⁴ In Infigen, the Western District Court of Wisconsin opined that the only patents to which § 271(e)(1) applies to were those which qualified for the term extension in § 156(f).¹⁷⁵ However, food and color additives are not eligible for term extensions, because they are not subject to a stringent pre-market approval process as required under § 156(a), though they are technically listed in § 156(f) as being eligible for term extension. Thus, the holding of Infigen is somewhat contradictory. On one hand, the court asserted that the safe harbor in § 271(e)(1) is available for all products defined in § 156(f).¹⁷⁶ On the other hand, not all products defined in § 156(f) as eligible to receive term extensions may actually receive a term extension because of the regulatory review requirement of § 156(a). Thus, the Infigen court broke from earlier holdings of the Federal Circuit that rejected symmetry between § 156 and the safe harbor in § 271(e)(1).

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

Bristol-Myers, an unpublished decision, is the first case to directly address the issue of whether the safe harbor of § 271(e)(1) applies to patented research tools.¹⁷⁷ The Southern District of New York held that “absent clear Congressional intent to the contrary, the term ‘patented invention’ should be interpreted consistently with other subsections of section 271”¹⁷⁸ According to the court’s reading of the legislative intent, Congress did not intend to restrict § 271(e)(1) to only patents eligible for term extensions under § 156.¹⁷⁹ Consequently, all otherwise infringing activities that are used to develop or submit information pursuant to obtaining FDA *28 approval for a drug or device are exempted by the safe harbor, including patented research tools.¹⁸⁰

vii) Integra Lifesciences I, Ltd. v. Merck KGaA

Integra is the most recent case in the saga of cases interpreting § 271(e)(1).¹⁸¹ Before the Supreme Court decided the case, Integra marked the first instance in which the Federal Circuit narrowed the scope of § 271(e)(1) after 20 years of steady expansion.¹⁸² The Federal Circuit held that general research activities used to screen potential drug candidates were not protected by the safe harbor of § 271(e)(1).¹⁸³ In dicta, the Federal Circuit commented on the potential problem the holding could raise with respect to patented research tools:

[E]xpansion of section 271(e)(1) to include [new drug development] activities would effectively vitiate the exclusive rights of patentees owning biotechnology tool patents. After all, patented tools often facilitate general research to identify candidate drugs, as well as downstream safety-related experiments on those new drugs. Because the downstream clinical testing for FDA approval falls within the safe harbor, these patented tools would only supply some commercial benefit to the inventor

when applied to general research. Thus, exaggerating section 271(e)(1) out of context would swallow the whole benefit of the Patent Act for some categories of biotechnological inventions. Needless to say, the 1984 Act was meant to reverse the effects of Roche under limited circumstances, not to deprive entire categories of inventions of patent protection.¹⁸⁴ By stating that the “downstream clinical testing . . . falls within the safe harbor,” the Federal Circuit implied that use of patented research tools is eligible for § 271(e)(1) protection, provided that the research tools are used pursuant to a testing phase of a new drug approval process. Integra directly affirmed and narrowed the scope of the “reasonably related” test¹⁸⁵ set forth in Intermedics,¹⁸⁶ and, for the first time, directly commented on the status of research tools with respect to the safe harbor.

***29** The Supreme Court rejected the Federal Circuit’s holding, but impliedly affirmed the Federal Circuit’s stance on symmetry.¹⁸⁷ The Court sided with the Federal Circuit’s analysis of Eli Lilly as decided in *AbTox*, that the plain language trumps any symmetry.¹⁸⁸ However, the Supreme Court limited its holding to the scope of “reasonably related” and did not comment on the scope of “patented invention” in § 271(e)(1).¹⁸⁹ Indeed, the Court expressly avoided the issue of application of § 271(e)(1) to patented research tools. In a footnote, the Court opined, “We . . . do not . . . express a view about whether, or to what extent, [section] 271(e)(1) exempts from infringement the use of ‘research tools’ in the development of information for the regulatory process.”¹⁹⁰

The Court further held that “basic scientific research” was outside the purview of the safe harbor, but activities not ultimately used to submit information to the FDA were within the safe harbor.¹⁹¹ Although the scope of “reasonably related” is unresolved after *Integra*, one may infer that as the holding relates to research tools, anything goes - research tools may be used by pioneer or generic drug companies, license free, provided the end goal leads to development of information that could be submitted under an IND, NDA, or ANDA, regardless of the timing or whether the information is ever submitted to the FDA.¹⁹² Thus, the holding did little to clarify the research tool problem. It only further confused the issues as they relate to research tools.

***30** 5. Research Exemption versus the Safe Harbor

More recently, scholars have proposed that research tools qualify under a more general research exemption,¹⁹³ similar to the now practically dead research exemption created in the early nineteenth century.¹⁹⁴ In light of the *Madey* decision,¹⁹⁵ which instituted the death of the common law research exemption for all practical purposes, scholars are taking a closer look at how research tools fit into the overall picture of patent policy. A broad overview of the research exemption is beyond the scope of the present issue; nevertheless, a short treatment of the research exemption puts in context the issues involving § 271(e)(1). This is especially true since much of the push within the research exemption camp is to codify a research exemption similar to the language of § 271(e)(1).¹⁹⁶

With respect to Congress’s attempt to codify a research exemption, otherwise infringing uses of research tools were specifically exempted.¹⁹⁷ The only permissive uses of a patented research tool, according to the proposed statute, would be research on the patent research tool itself. Unauthorized uses with the research tool would constitute infringement. The bill died in the House of Representatives.¹⁹⁸

Since the time of the bill, other groups have commented on the necessity of changes in the patent statute including the National Institute of Health, Federal Trade Commission, and others.¹⁹⁹ The groups found that a tension exists, naturally, between the patent holder of a research tool and institutions that seek to use the tool ***31** commercially. If the tool is useful in the generation of information, the holder of the research tool patent looks to institutions such as pharmaceutical companies as potential licensees.²⁰⁰ Other research tool owners complained that § 271(e)(1)’s safe harbor effectively removes the value of the research tool.²⁰¹ Conversely, companies that would use the research tools complained about problems unique to biotechnology tools such as the blocking effect. The blocking effect prevents a company from using the tool, even when it offers a substantial advantage, simply because the patent owner refuses to license the tool.²⁰²

All of these issues are compounded because discovery and innovation of research tools are often federally funded. The universities spin off the tool as a startup company under the Bayh-Dole rules. Companies that would otherwise benefit from the use of such tools make the argument that if the taxpayer foots the bill for the discovery, companies should be entitled to reasonable uses and licenses of the technology.²⁰³

B. Scope of § 271(e)(1) With Respect to Research Tools

Despite the intent of Congress, § 271(e)(1) appears to apply to patented research tools. The plain language clearly exempts, in light of Eli Lilly, more than just drugs. In order to determine how research tools fit into the scheme of § 271(e)(1), if at all, the various frameworks of the safe harbor must be considered in context. Under which contexts should patented research tools be exempted, and to what extent? And what policy reasons read against the plain language of § 271(e)(1)?

As previously noted, courts are inconsistent in the treatment of § 271(e)(1). Problems regarding the scope of § 271(e)(1) took center stage in Eli Lilly when the Supreme Court took a plain language approach to the term “patented invention.”²⁰⁴ *32 It again arose in Integra when the Supreme Court adopted a plain language approach to the scope of “reasonably related.”²⁰⁵

After Eli Lilly, courts focused on two phrases from § 271(e)(1) in the interpretation of its scope. First, they looked at whether the use of the patent was “reasonably related” to the pursuit of FDA approval.²⁰⁶ Second, courts asked whether the invention qualified as a “patented invention” under § 271(e)(1).²⁰⁷ In order to apply § 271(e)(1) to the research tool patent problem, it must be evaluated by both criteria, as well as the principles underlying the inclusion of the Bolar Amendment into the Hatch-Waxman Act.

1. Policy Considerations Under § 271(e)(1)

The legislative history is a poor guide for interpreting what Congress tried to accomplish with § 271(e)(1).²⁰⁸ The safe harbor of § 271(e)(1) was not part of the original quid pro quo that comprises the body of Hatch-Waxman.²⁰⁹ Indeed, it appears that § 271(e)(1) was an afterthought, that corrected only the de facto term extension that a pioneer drug company enjoyed due to the necessity of FDA approval before the marketing of generic drugs.²¹⁰ Because the Bolar Amendment was not originally included in the bill, policy considerations arising from the legislative debates cannot be easily assigned. Nevertheless, Congress considered three main themes that appear to be important to the passage of the Hatch-Waxman Act as a whole. They are: (1) providing the consumer with cheap, generic versions of drugs; (2) reducing the latency time in which the generic drug appears on the market after the expiration of the patent; and (3) accomplishing the first two goals while preserving *33 the incentives to pioneer drug companies to invest in new drug discovery and marketing.²¹¹

Congress’s first intended goal with the passage of Hatch-Waxman was to make cheap drugs available to the public. Congress accomplished this by two means: amending the FDCA to allow generic drug manufacturers to take advantage of the ANDA process for drug approval,²¹² and creating a right to a de minimis interference on the rights of the pioneer drug patent holder in order to pre-approve generic drugs.²¹³ These provisions of Hatch-Waxman, in aggregate, removed the barriers keeping widespread generic drugs out of the market.

Congress accomplished the second goal by bringing generic drugs to market cheaper and more quickly with the ANDA process and the safe harbor. The amendment to the FDCA, which made the ANDA procedure available to generic drug manufacturers, provided the incentive to generic pharmaceutical manufacturers to enter the market. This was due to a drastic reduction in the costs associated with the FDA approval process, compared to those of the NDA approval process. Congress intended to drive down the cost of bringing generic drugs to market because they would not have a term of market exclusivity to recoup the cost associated with the FDA approval process.²¹⁴ In addition to making the entry of generic drugs into the marketplace feasible for generic manufacturers from a cost standpoint, Congress also amended the patent statute to remove the latency between the expiration of the patent and the arrival of the generic version of the drug on the market. This goal was accomplished by the safe harbor of § 271(e)(1).

Finally, Congress wanted to bring cheap, generic drugs to market as soon as possible, but only if the incentives were preserved that brought innovative new drugs to market by pioneer pharmaceutical manufacturers.²¹⁵ To accomplish this, Congress introduced § 156 to the patent statute, which gave pioneer pharmaceutical manufacturers a statutory right to recover market exclusivity lost to the FDA approval process. Congress designed § 156 to replace the de facto term extension, which helped pioneer pharmaceutical manufacturers recoup the investment in research and development prior to passage of the Hatch-Waxman Act. Congress offset any loss of de facto term extension through the term contained in § 271(e)(1). In conjunction with the changes to the FDCA, this brought generic drugs to market as soon as the term of the patent expired. Thus, pioneer pharmaceutical companies *34 had more time to recoup their investments in research and development and FDA approval. In the end, pioneer drug companies received a larger window of statutory exclusivity, but lost the bars keeping generic drugs off the market.

2. Making Sense of the Interpretations of § 271(e)(1)

i) “Reasonably Related”

Patented research tools are “reasonably related” to FDA approval when they are used to develop or submit data to the FDA.²¹⁶ Research tools that might qualify include testing procedures, processes, and apparatuses; DNA probes; and patented enzymes.²¹⁷ Naturally, research tools can, in most instances, also be used for purposes other than for FDA approval, and in such cases they do not fall under the scope of § 271(e)(1).²¹⁸ Although an in-depth analysis of the dividing line between when a research tool patent is or is not reasonably related is beyond the scope of this paper, it is helpful to put the problem into context with respect to the point in the approval process when the safe harbor applies. Doing so helps to circumscribe which research tools can benefit from the safe harbor of § 271(e)(1).

As previously discussed, the Federal Circuit and now the Supreme Court grappled with the timing issue with respect to when the safe harbor serves as a defense to patent infringement. According to the Supreme Court, the safe harbor protects nearly all unlicensed uses of patented inventions when used pursuant to the FDA approval process.²¹⁹ In part, the Supreme Court held:

We think it apparent from the statutory text that § 271(e)(1)’s exemption from infringement extends to all uses of patented inventions that are reasonably related to the development and submission of any information under the FDCA. . . . There is simply no room in the statute for excluding certain information from the exemption on the basis of the phase of research in which it is developed or the particular submission in which it could be included.²²⁰ The Supreme Court opted for the plain language, but left questions regarding at what point an otherwise infringing use falls outside the safe harbor. In any event, *35 both the Federal Circuit and the Supreme Court’s holdings appear to ignore Congress’s intent of a de minimis impact on the inventions using the safe harbor.

ii) “Patented Invention”

a) How the Legislative History Muddled the Scope

The research tool problem more naturally falls under the second approach for resolving issues with § 271(e)(1), which is an analysis of the phrase “patented invention.” The difficult issue to resolve with respect to the term “patented invention” is its scope. Both the legislative history and statutory language are silent.²²¹ Congress’s original consideration of the scope of the term “patented invention” omitted animal drugs and veterinary biological products.²²² In 1988, they further narrowed the scope of which animal drugs and veterinary biological products should be excluded by amending the safe harbor to specifically exclude animal drugs and veterinary processes manufactured by molecular biological techniques.²²³

Similarly, records of the House and Senate debates suggest that the focus concentrated primarily on drugs as the patented inventions eligible for the safe harbor.²²⁴ The debate in both houses focused on drugs: the advantages of cheap drugs,²²⁵ the necessity to protect the patent protection of drugs,²²⁶ and the compromise between pharmaceutical companies and the public’s need for cheap, generic drugs.²²⁷ Medical devices were not mentioned in the debates, nor did Congress consider patented research tools. Despite Congress’s seemingly myopic vision of the safe harbor as applying only to drugs and some medical devices, the version ratified contained no narrowing language. Thus, in the case of § 271(e)(1), Congressional debates indicated that it applied to drugs and some devices, but Congress ratified the bill with no such narrowing language. Consequently, the true intent of Congress is obscured by the seemingly inconsistent messages. The most likely explanation *36 is that Congress simply never anticipated that § 271(e)(1) would apply to patents covering more than just drugs and some “medical devices.”²²⁸

b) The Supreme Court Attempted to Clarify the Scope

In *Eli Lilly*, the Supreme Court attempted to sort out the inconsistencies in the legislative history and the text of § 271(e)(1).²²⁹ The Court opined that §§ 201 (§ 156) and 202 (§ 271(e)) of Hatch-Waxman are intended to be complementary.²³⁰ Despite the lack of narrowing language in § 271(e)(1), the Supreme Court indicated that it was part of an “overall scheme” intended to correct the distortions on the front end of the patent term (FDA approval) and on the back end of the patent term (the de facto term extension).²³¹ The Court confused the issue, however, with the suggestion that “there may be some relatively rare situations in which a patentee will obtain the advantage of the § 201 extension but not suffer the disadvantage of the § 202 noninfringement provision, and others in which [the patentee] will suffer the disadvantage without the benefit.”²³² The Court reinforced and expanded this principle in *Integra*.²³³ Thus, the court implied that symmetry is the

overriding principle. But the Court said that it does not always apply, opening the door to Class I and II medical devices, cosmetics, and research tools, none of which are eligible for term extension under § 156.²³⁴ Indeed, the Court expressly rejected this sort of “disequilibrium [from becoming] the general rule for patents relating to all products (other than drugs). . . .”²³⁵ But, if the door is open to large classes of patented inventions such as Class I and II medical devices, cosmetics, and research *37 tools, what did the Court mean by “relatively rare situations” ? The application of “relatively rare” to entire classes of inventions is therefore contradictory, which leaves the reader’s understanding no clearer with respect to the scope of § 271(e)(1).²³⁶

c) Principles Taken From the Definitions of § 156.

Another way to reconcile the scope of the term “patented invention” is through the definitions codified as part of § 201 of the Hatch-Waxman Act.²³⁷ Because of the complementary nature of §§ 156 and 271(e)(1),²³⁸ Congress plausibly intended for the definitions to apply to both sections equally.²³⁹ Indeed, the Supreme Court reinforced this principle when it stated that the “1984 Act [must be] taken as a whole.”²⁴⁰

Based on the literal language of the definitions, however, this argument is tenuous. In § 156, the term “product” is narrowed to human drug products or medical devices subject to regulation under the FDCA, in addition to food additives and cosmetics.²⁴¹ The term “patent” is defined to be “a patent issued by the United States Patent and Trademark Office,”²⁴² a much broader application than the scope of “product.”²⁴³ Furthermore, the term “invention” is conspicuously absent from the definitions, suggesting that the definitions were not intended to apply to § 271(e)(1), especially given the fact that §§ 271(e)(1) and 156 were not drafted at the same time. Using this reasoning, it seems unlikely that Congress intended the definition of “product” to extend to the scope of “patented invention.” Nevertheless, even if the definitions do not apply directly, they shed additional light as to the Congressional intent of the meaning of “patented invention.” This logic gives credence to the argument that “product” and “invention” are analogous because they serve similar functions--they both define the scope of the products or inventions *38 that are eligible for the safe harbor or term extension. If the symmetry principle is applied, they would have to be the same product or invention.

It is just as easy to argue that if §§ 156 and 271(e)(1) are to be taken as a whole, then the terms arguably were intended to be non-analogous and have different scopes. The Supreme Court strengthened this argument by suggesting § 271(e)(1) can apply without § 156 and visa versa.²⁴⁴ Under this line of analysis, the term “patented invention” is unrestricted except that it be reasonably related to the pursuit of the generation of information under laws regulating drugs. It is based on a plain language approach, implying that Congress purposefully chose not to include narrowing language in § 271(e)(1) because of its overall goal of ensuring cheap, generic drugs. Thus, the definitions of § 156 serve no purpose with respect to the interpretation of the scope of “patented invention” in § 271(e)(1).

Unfortunately, twenty years after the fact either argument is plausible. Presumably, in the spirit of viewing the 1984 Act as a whole, the best approach may be to use § 156’s framework and the complementary nature of §§ 156 and 271(e)(1) to elucidate general principles embodied in the Hatch-Waxman Act. Section 271(e)(1) would then be read in light of the goals of Congress and the overall principles embodied in the Hatch-Waxman Act as a whole. The result would balance the principles of (1) symmetry, (2) reading the 1984 Act as a whole (where the distortions imbued in the patent term are removed from both the front end and the back of the patent term) except in rare situations, and (3) the overall goal of providing the public with cheap, generic drugs while preserving incentives to pioneer patent manufacturers. These principles would resolve problems when the plain language application defeats legislative purpose of the safe harbor. The scope of the plain language of § 271(e)(1) would apply to any patented invention as long as it furthers the overriding goals set forth by Congress and read in light of the principles gleaned from § 156, Eli Lilly, and Integra. Naturally, medical devices, cosmetics, and food additives would be within the scope of “patented invention” because they are included within the subject matter of the FDCA.²⁴⁵ Research tools, on the other hand, which are not part of the subject matter of the FDCA,²⁴⁶ may fall outside the scope of the safe harbor.

*39 3. Where Patented Research Tools Fit

i) Public Policy Arguments

Patented research tools must be evaluated both from the standpoint of patent law policy and also the stated goals of the Hatch-Waxman Act.²⁴⁷ Naturally, the principle of a safe harbor is contrary to the principle of market exclusivity embodied in

the patent statute.²⁴⁸ Patents give inventors incentives to create and market their inventions. Courts recognized a general research exemption at common law, but the Federal Circuit recently indicated that it was not available for uses with commercial implications.²⁴⁹ From the standpoint of patent policy, current trends tend to be more protective of patent exclusivity.²⁵⁰ Nevertheless, the safe harbor of § 271(e)(1) is not a common law principle, and a careful balancing of policy, where the FDCA significantly affects the term of exclusivity granted to a patent holder, justifies a safe harbor to combat the term effects resulting from a long FDA approval process.²⁵¹ From the standpoint of patent law, however, extension of the scope of the safe harbor to Class I and II medical devices, cosmetics, and other products covered by the FDCA with no extensive pre-market approval process is a stretch. This result makes sense because the FDCA does not require extensive pre-market testing on these devices that effectively toll the term of their patents. Moreover, if protection for these devices that are included in the scope of the FDCA is a stretch,²⁵² then extension of the safe harbor to patented research tools is an even greater stretch because research tools are not covered by any federal legislation requiring a regulatory process. In other words, like Class I and II medical devices, research tools have no need for a term extension. Arguably then, they also have no need for a safe harbor according to a symmetry argument.

As previously noted, Congress attempted to create a market environment where cheap, generic drugs were available to consumers, while preserving the incentives to pioneer pharmaceutical companies to pursue research and development *40 of new drugs.²⁵³ Congress took the patent policy into account, but in the end decided that the safe harbor was, at most, a de minimis interference.²⁵⁴ The overriding policy concern for Congress was the lack of generic drugs in the marketplace and the resultant high costs of drugs to consumers.²⁵⁵

If the Congressional goal of cheap drugs trumps the patent policy of market exclusivity, then one can argue that allowing research tools to be part of the scope of § 271(e)(1) furthers the Congressional goal by reducing costs for drugs in two ways. First, including otherwise infringing activities conducted using patented research tools in § 271(e)(1) dispenses with the need for licenses, paying premium prices for patented technology, and in some cases the blocking effect, (which is the inability to secure the rights to use a particular research tool that would save the pharmaceutical manufacturer time and money that could conceivably be passed to the end user).²⁵⁶ Second, because the plain language of the safe harbor implies that any patented invention is within the scope of § 271(e)(1), pioneer drugs may enjoy the benefit of the safe harbor, which results in cheaper pioneer drugs, furthering Congress' overall goal of providing consumers with cheap drugs while retaining the incentives to pioneer patent manufacturers.²⁵⁷

Although plausible, this result seems to be afield of the legislative history. It is also at odds with the symmetry principle. Nevertheless, it is within "the broader holding of *Eli Lilly*," which says that § 271(e)(1) relates to a federal scheme of laws, such as the FDCA, and not to specific statutes relating to drugs.²⁵⁸ Arguably, there are strong policy reasons against this result, but the plain language and the litany of cases involving § 271(e)(1) make this result possible, and even probable.²⁵⁹ Both the Supreme Court and the Federal Circuit suggested in dicta that uses of patented research tools falls under the safe harbor.²⁶⁰ Insofar as research tools are concerned, *41 the dicta is consistent with the broad holding of *Eli Lilly* and the plain language of "patented invention."

Nevertheless, extension of the safe harbor to research tools seems contrary to the overall legislative intent of Hatch-Waxman, which argues against this result. If Congress truly intended § 271(e)(1) to reverse *Roche v. Bolar*,²⁶¹ then extension of the safe harbor to research tools goes far beyond the original Congressional intent. That said, Congress did not comment on research tools, leaving a statute that reads as more inclusive than necessary to overturn *Roche*. Presumably, this explains why the Federal Circuit cites *Roche* as the motivation behind the safe harbor,²⁶² while permitting an expansive scope of "patented invention" that includes research tools.

By stating that "the 1984 Act was meant to reverse the effects of *Roche* under limited circumstances,"²⁶³ the Federal Circuit sent contradictory messages. *Roche* dealt with the potential infringement of pioneer drug patents by generic drugs used prior to the expiration of the pioneer patent in order to begin the FDA approval process of the generic drug.²⁶⁴ If Congress intended the Bolar Amendment to be the sole element of the quid pro quo benefiting the generic companies, then one can make a strong argument that otherwise infringing uses of research tools falls far outside the scope of the original Congressional intent. However, as previously noted and contrary to the assertion of the Federal Circuit, overturning *Roche* was only one aspect of the quid pro quo benefiting generic drug companies.²⁶⁵ In the end, the Federal Circuit suggested that research tools belong in the scope of the safe harbor, but left as unclear the meaning of the discussion relating to *Roche*.²⁶⁶ Plausibly, the *Roche* discussion may be a warning shot that the applicability of research tools may merit additional scrutiny if their applicability to the safe harbor is ever litigated.

Thus, the only grounds to invalidate an otherwise infringing use of a research tool for a pioneer drug is pure public policy stemming from the legislative history. Any court holding that the scope of § 271(e)(1) does not extend this far does so against twenty years of precedent.²⁶⁷

***42 ii) De minimis Interference Arguments**

Congress justified suspension of the patent doctrine of exclusivity because it perceived only a de minimis interference to the rights of patent holders.²⁶⁸ When the interference to a drug patent is limited to FDA approval activities, the impact is minimal. The Supreme Court strengthened this principle by holding that pre-FDA approval activities designed to isolate drug candidates was de minimis.²⁶⁹ Activities pursuant to the FDA approval process, by definition, only slightly impact the applicable market for the pioneer drug.²⁷⁰ Naturally, participants in the clinical trials for the generic equivalent of patented drugs do not buy the patented version that they use, which is a slight impact on the rights of a patent holder. Overall, the market for the patented drug is only slightly impacted by the FDA trials.²⁷¹

The analysis is trickier when applied to patented research tools. One argument is that the impact on the applicable drug and the impact to the market for the research tool are not analogous. The relevant market for the drug patent is only slightly impacted by FDA approval activities. Conversely, the market impact is much more substantial when the use of a research tool is exempted by § 271(e)(1), because the tool may be designed for uses such as the generation of data for FDA approval. In this way, interference with the rights of a research tool patent holder has the potential to preempt a much larger degree of the invention's utility.²⁷² A scenario where this is the case, however, may be the exception, not the rule.

Preemption of a substantial portion of the market of a patented invention is only questionably a de minimis interference. The issue of what constitutes a de minimis interference as contemplated by Congress is difficult to determine. However, using a research tool reasonably related to FDA approval of the generic version of a patented drug impacts the research tool much more than it impacts the rights associated with the drug. Uses of a patented drug for purposes of FDA approval only minimally affects the market for the patent. Because FDA approval prevents marketing of the generic version of a patented drug, the use is de minimis. But no such constraint occurs with the research tool. The inventor of a research tool useful in generating data for FDA approval under the FDCA no doubt considers *43 pharmaceutical companies as potential sources of remuneration. Exempting research tools is therefore not necessarily a de minimis use. Thus, the impact on the research tool is nearly always more substantial than the use of a patented drug under § 271(e)(1).

The real issue is whether a de minimis interference approach is the best analytical tool justifying inclusion of research tools within the scope of § 271(e)(1). The Federal Circuit suggested that the patent statute has no de minimis interference doctrine.²⁷³ Nevertheless, Congress codified a limited interference with the passage of § 271(e)(1). Thus, in this particular pocket of the patent statute, the concept of a de minimis interference still lives, but its scope remains unclear and is certainly narrowly circumscribed.

iii) Legislative Intent Arguments

Courts have struggled with the legislative history as it relates to § 271(e)(1) because the legislative intent is not what is reflected in the plain language. Under the plain language rule, unless the plain language stands opposite of a “clearly expressed legislative intention to the contrary,” then the legislative history is not considered in the interpretation of a statute.²⁷⁴ The issue is whether Congress clearly intended to preclude the application of § 271(e)(1) to research tools or if Congress intended the scope of the safe harbor to cover them.

Clearly, Congress intended for the safe harbor of § 271(e)(1) to overturn Roche.²⁷⁵ Recall, in Roche the Federal Circuit held that uses of a patented drug pursuant to FDA approval of a generic version prior to the patent's expiration was an infringing use.²⁷⁶ The broader principle that Congress intended by overturning Roche was the elimination of the de facto term extension as part of the quid pro quo for the statutory term extension of § 156. Looking at the broader principle in this way infers application of the symmetry principle, which the Federal Circuit rejected *44 in AbTox and Chartex.²⁷⁷ Thus, both the AbTox and Chartex decisions are at odds with the legislative history, which by its broader principles suggest the symmetry principle.²⁷⁸

Application of the safe harbor to generic drugs and Class III medical devices fall within the purview of the symmetry

principle because they are products which require lengthy pre-market approval from the FDA, or in other words products which receive the benefits of § 156. However, application of § 271(e)(1) to Class I and II medical devices is unsymmetrical because they are not eligible for term extensions under § 156.²⁷⁹ Moreover, they arguably do not need the safe harbor, because without a lengthy pre-market approval requirement, there is no de facto term extension to be overcome. Nevertheless, Eli Lilly and Integra permit application of the safe harbor to situations in which symmetry does not apply. The Supreme Court, having considered the broader principle, expressly rejected the obligatory application of symmetry in this regard.²⁸⁰ Ironically, the Court arrived at this conclusion in Eli Lilly based on careful study of the legislative history.²⁸¹ In the end, the Supreme Court embraced the symmetry principle, but only weakly. On one hand, the Court held that the term “Federal law which regulates the manufacture, use, or sale of drugs,” means a general statutory scheme.²⁸² In so doing, they relied on a plain language interpretation of “patented invention” when the Court held that if Congress intended § 271(e)(1) solely for drugs, it would have inserted language that left no ambiguity with respect to the limitation.²⁸³

On the other hand, the Court relied on the legislative history for guidance as to the scope of “patented invention,” and commented at length about the “distortions” on the front and tail ends of a pioneer drug patent that Hatch-Waxman attempted to correct.²⁸⁴ In so doing, the Supreme Court endorsed the symmetry principle.²⁸⁵ Faced with the proposition of choosing either the plain language or the *45 symmetry principle, the Federal Circuit rejected the symmetry principle in favor of the plain language.²⁸⁶ Thus, in principle, the plain language rule applies for purposes of clarity, predictability, and because the plain language holdings in AbTox and Chartex are clearly contrary to both Roche and the symmetry principle.²⁸⁷ These holdings bode well for those who seek to bring otherwise infringing uses of patented research tools under the safe harbor of § 271(e)(1), because symmetry is not generally required for a patented invention to qualify under the safe harbor.

iv) Plain Language Arguments

Having concluded that the most probable analysis for § 271(e)(1) is the plain language approach, the scope of the safe harbor likely encompasses uses of patented research tools, provided that their use is pursuant to FDA approval. At first glance, application of § 271(e)(1) to patented research tools does not seem congruent with the legislative intent. Indeed, one can easily imagine that Congress and the Supreme Court never considered § 271(e)(1)’s application to any patented invention other than those delineated as part of the FDCA, such as drugs, medical devices, food, and cosmetics. But patented research tools are ubiquitous today, necessitating a uniform approach to their application to § 271(e)(1).²⁸⁸ A plain language construction is one way of implementing a consistent approach to the safe harbor.

The application of a plain language construction of § 271(e)(1) begs the question of what limits, if any, are applicable to the safe harbor, bearing in mind that the Supreme Court stated that the non-symmetry disequilibrium should be the exception, not the rule.²⁸⁹ With the exception of the necessity to be “reasonably related to the development and submission of information,” it appears that anything goes.²⁹⁰ Thus, as to the scope of patented invention, a plain language construction allows any patented invention be used under the exemption, so long as the use meets the reasonably related test.

Consequently, the research tool problem potentially opens the doors to pioneer pharmaceutical manufacturers to take advantage of the safe harbor in the generation of data for FDA approval of new drugs. Under the plain language, pioneer pharmaceutical manufacturers can sidestep the quid pro quo altogether and get the *46 advantage of both the patent term extension and safe harbor of § 271(e)(1) as they employ research tools as part of the approval process of new drugs. Moreover, in Integra, both the Supreme Court and the Federal Circuit addressed the timing issue of a pioneer pharmaceutical company’s use of the safe harbor, but declined the opportunity to address the topic of who should be permitted to take advantage of § 271(e)(1).²⁹¹ The recent decisions of the Federal Circuit and Supreme Court may have implicitly ratified the use of the safe harbor for the development of information for both generic drugs and pioneer drugs.²⁹² This result squares with a plain language reading of § 271(e)(1), but certainly not with the legislative history.

The current state of the research tool problem gives no clear indication how it will eventually be resolved. On one hand, the Supreme Court and Federal Circuit ratified use of research tools under the scope of § 271(e)(1) by insisting on a plain language reading. On the other hand, the application of the safe harbor based on the plain language is so far from the “big picture” Congress intended with the Bolar Amendment as to be a prime target for application of the Plain Language Rule²⁹³ and the legislative history, or in other words, the symmetry principle. However, because Congress never directly addressed the problem of patented research tools, it may be difficult to meet the “clearly expressed legislative intent to the contrary” standard imposed by the plain language rule.²⁹⁴

At the very least, using research tools under the safe harbor contributes to one of Congress' overall goals, which was to bring cheap drugs to market quickly, because use of research tools in the process of FDA approval saves both time and money. Moreover, rejection of the Kindness Amendment, which would have required symmetry, gives further credence to the argument that the legislative history is not clearly "to the contrary" of an application of § 271(e)(1) to patented research tools.²⁹⁵ But one can just as easily argue from the standpoint of the quid pro quo that unfettered access to § 271(e)(1) is exactly what the Supreme Court condemned as making a "disequilibrium [of symmetry] the general rule."²⁹⁶ Until either the Supreme Court, the Federal Circuit, or Congress directly addresses the problem with respect to research tools, pharmaceutical companies can take their chances on otherwise infringing uses of research tools.

***47 III. PART THREE: SOLUTIONS**

A. Solutions Related to the Bolar Amendment

I. Judicial Treatment

When the Federal Circuit decided *AbTox, Inc. v. Exitron Corp.*,²⁹⁷ it held that of the two holdings of *Eli Lilly*, the plain language construction trumped the symmetry holding. The Federal Circuit opined:

[U]nder the broad holding of *Eli Lilly*, all classes of medical devices fall within the plain meaning of section 271(e)(1). Nevertheless, under the Court's narrower justification of statutory symmetry, only Class III devices fall within the section. Ultimately, this court must follow the Supreme Court's broader holding, which remains in force despite a potential conflict with its own narrower reasoning.²⁹⁸ Given the clear indication from the Federal Circuit that the plain language analysis controls the interpretation of § 271(e)(1),²⁹⁹ lower courts must fall in line. While the official position is a plain language construction, § 271(e)(1) permits otherwise infringing uses of research tools when used to generate information for the FDA approval process. Any change to the status of research tools under § 271(e)(1) requires a reversal of the Federal Circuit's interpretation of *Eli Lilly* in favor of the symmetry principle.

Thus, if the courts are to resolve the research tool problem, they have three options. First, they can stand by the litany of decisions since *Eli Lilly* and *Integra* and let Congress fix the research tool patent problem. Thus, the courts would defer to Congress the decision whether patented research tools fall within the scope of § 271(e)(1). After all, because Congress created the confusion in the first place, it is presumably in the best position to clarify the legislative intent with respect to research tools, if necessary.

Second, the Supreme Court can revisit *Eli Lilly* and hold that symmetry trumps plain language. However, the Court's holding in *Integra* now makes this option more unlikely than ever. *Integra* affirmed the Federal Circuit's opinion in *AbTox* and *Chartex* that the safe harbor does not require symmetry.³⁰⁰ The Court expressly affirmed this principle: "[section 271(e)(1)] exempted from infringement all uses of patented compounds 'reasonably related' to the process of developing information for submission under any federal law regulating the manufacture, use, or *48 distribution of drugs."³⁰¹ Moreover, the Court expressly provided that § 271(e)(1) embraced experimentation before clinical trials started.³⁰² Thus, the scope of § 271(e)(1) includes submissions of information generated by experimentation that alone would not necessarily give rise to a term-extension eligible invention.

If the Supreme Court were to directly address the issue of research tools in the future, it could conceivably embrace the symmetry principle. The Court declined to decide the role of research tools in the overall rubric governing the safe harbor. In light of the holdings of *Eli Lilly* and *Integra*, however, changing the current interpretation might do more harm than good. It could send ripples of uncertainty throughout the pharmaceutical industry with respect to the scope of the safe harbor not only for previous research conducted with unlicensed research tools, but also Class I and II medical devices. If tool owners had a strong bargaining position prior to the use of research tools that pharmaceutical companies consider necessary to current research and development, they would be in substantially stronger positions with the prospect of shutting down costly research projects midstream while the parties negotiated licenses.

One can, on the other hand, make an argument that changing the interpretation of the safe harbor does not result in unreasonable pecuniary losses to industry. Class I and II devices have no need for the safe harbor of § 271(e)(1), at least in

light of the legislative history, because they don't require extensive regulatory delays prior to commercialization of the inventions.³⁰³ If there is no lengthy FDA approval process to necessitate the exemption, then there is arguably no need of a safe harbor to ameliorate the effect of de facto term extensions. The same is true for research tools. This, in effect, is the symmetry principle--reducing de facto term extensions occurring due to regulatory delays in the approval process, which the Supreme Court and Federal Circuit rejected. Class I and Class II medical devices do not need regulatory approval prior to marketing. Therefore, the effect of a reversal in the courts, though creating uncertainty, may only minimally affect the profits for some of these inventions.

The Federal Circuit already spoke to the scope of the safe harbor as it relates to research tools. Thus, the Federal Circuit is unlikely to reverse *AbTox* and *Chartex* despite the growing role of research tools in the pharmaceutical industry. The Federal Circuit is fairly consistent in their application of plain language over symmetry. Therefore, there is no reason to believe that the Federal Circuit views *49 unlicensed uses of research tools as a problem, especially in light of their dicta in *Integra* regarding research tools.³⁰⁴

Finally, courts can take an intermediate approach, deciding the scope of § 271(e)(1) with respect to research tools case-by-case, and invention-by-invention. Unfortunately, the last option leaves the entire safe harbor unpredictable, unsettled, and may lead to a chilling effect on the use of research tools where the legislative intent does not specifically forbid it. Moreover, with this sort of uncertainty, pharmaceutical companies may have an incentive to freely impinge on patented research tools, gambling that (1) they won't be sued or (2) they can afford the damages.

2. Congressional Intervention

Congress is in the best position to clarify its intent with respect to whether the scope of § 271(e)(1) extends to patented research tools. A need to clarify exists if Congress truly did not intend the scope to extend to research tools. However, extension of the scope to research tools contributes to the goal of cheap drugs that can be marketed immediately upon the expiration of the pioneer drug's patent, which was a stated goal of Congress.³⁰⁵ Certainly, Congressional silence does not endorse the extension of the safe harbor to patented research tools, but neither does it condemn it. Thus, Congress should act to clarify the scope of § 271(e)(1) as it applies to non-drug patented inventions.

i) What Congress Has Done

Congress recently proposed two new bills designed to correct problems discovered since Hatch-Waxman's original passage in 1984. Neither the Drug Competition Act of 2001³⁰⁶ nor the Greater Access to Affordable Pharmaceuticals Act of 2003³⁰⁷ address research tools directly. Nevertheless, they are indicative of the types of problems inherent in Hatch-Waxman. The Drug Competition Act of 2001 sought to correct collusive barriers imposed in the market by pioneer pharmaceutical companies.³⁰⁸ It required the pioneer pharmaceutical company to notify the FTC and the Department of Justice when they entered into settlement agreements *50 with generic pharmaceutical companies regarding Abbreviated New Drug Applications.³⁰⁹

The Greater Access to Affordable Pharmaceuticals Act of 2003 is more comprehensive. It sought to change the automatic status of the thirty month stay of approval in favor of a court ordered injunction.³¹⁰ It also sought to limit the 180 day period of exclusivity to generic pharmaceutical companies who either have been sued by the pioneer pharmaceutical company for patent infringement or have brought a declaratory judgment action against the pioneer company.³¹¹ Moreover, the 180 day exclusivity period would also be triggered in a settlement action that results in non-infringement or invalidity of the relevant patent.³¹² The 180 day period would roll to the next applicant if the generic company that wins does not continue to bring the generic version of the drug to market or changes their strategy to do it.³¹³ In summary, the bill attempted to prevent pioneer drug companies from behaviors that tended to keep generic drugs off the market.³¹⁴

Congress's omission of reforms relating to research tools does not mean that the problems do not merit Congressional attention. The more likely explanation is that issues involving research tools are a more recent development in the history of Hatch-Waxman that are yet to percolate into a bill.³¹⁵ The problems inherent in Hatch-Waxman as they relate to research tools, however, merit attention as illustrated by the problems discussed in this paper and may eventually require Congressional intervention.

ii) What Should Be Done and the Affects

If Congress acts to either exempt research tools or preclude them from the safe harbor of § 271(e)(1), the shape of the pharmaceutical industry will likely change. Some clarification as to the role of research tools in the bigger picture of for-profit research and development is immediately needed, especially as it relates to the pharmaceutical industry.

*51 B. Legislative Proposals Relating to Research Tools

As previously noted, research tools are a relatively new phenomena in patent law. These inventions are useful as tools to generate data in research fields such as biotechnology. They often constitute subject matter of questionable patentability, including facts and naturally occurring subject matter, such as genes, proteins, and naturally occurring compounds.³¹⁶ Europe deals with this problem with a specific carve-out for research tools.³¹⁷ The United States, however, continues to hold that the best course for the protection of research tools are patents. Patents provide continuing incentives to produce the tools and also encourage the rapid development of science and technology. Until compelling circumstances arise to directly address problems inherent in research tools, Congress is unlikely to act.³¹⁸ Nonetheless, experts on the problems associated with research tools have proposed a number of solutions to the problems associated with these tools, generally under a codified research exemption. Many address the problem with respect to the applicability of research tools to § 271(e)(1).

1. Proposal: Limited Research Exemption

In 1989, Rebecca Eisenberg proposed three conditions under which the use of research tools would be exempted.³¹⁹ First, use of the patented tool would be permitted to test the validity of the patent claims, allowing the scientific community not only to ensure that the claims merit a patent, but also to scrutinize the research itself and bring to light erroneous claims.³²⁰ Second, Eisenberg's proposal would permit uses of the patented research tools for the purposes of subsequent research that tends to improve the tool.³²¹ The second prong might actually be overly broad considering the justified fears within the biotechnology community that unfettered access to a tool could undermine the value of the tool.

Eisenberg addressed this fear in the third prong of the test she proposed: no exemption would be afforded for "invention[s] with a primary or at least significant market among research users."³²² For tools, however, one could argue that the primary market will always be undermined with unfettered access to the tool. While this is probably true for many broad spectrum research tools, many other tools, such as compounds, genes, and enzymes, would be available to the research community.

2. Proposal: Fair Use for Patent Law

Unlike Eisenberg's proposal, Maureen O'Rourke's proposal takes a markedly different direction.³²³ She proposed that patent law adopt a principle similar to the fair use defense in copyright law.³²⁴ The doctrine would adhere to a five factor test, similar to the fair use analysis in copyright.³²⁵ Factor one would consider "the nature of the advance represented by the infringing work."³²⁶ Essentially this boils down to a balancing test between the value of the invention to society and the right of the patent holder for remuneration.³²⁷ Factor two would consider "the purpose of the infringing use."³²⁸ This factor differentiates between commercial and non-commercial uses of patented inventions, including tools, which have a large market of non-commercial uses stemming from university research. Factor three would consider "[t]he nature and strength of the market failure that frustrates licensing."³²⁹ If the invention is not actively being licensed, then courts may allow for otherwise infringing uses where market forces restrict commercialization of the invention.³³⁰ The fourth factor would consider the overall impact of the otherwise infringing use on the market.³³¹ Finally, O'Rourke's proposal considers the nature of the patented work itself.³³²

The fifth factor would likely determine whether research tools are exempted under O'Rourke's fair use doctrine for patent law. For example, broad spectrum tools are not likely to meet the threshold of fifth factor, because the nature of the tool is more of an "end product." Additionally, because the entire market for a broad spectrum research tools can potentially be subsumed by allowing for a fair use, they may fail the threshold of the fourth factor as well. For tools like genes, cell lines, and enzymes, the case for fair use is better because of the limited market and the fact that these "inventions" are so close to unpatentable subject matter. However, in the end, exempting these more limited market research tools may be a moot point because researchers will still have the challenge of acquiring these types of tools without undue experimentation.

Maureen O'Rourke's proposal, while intriguing in principle, fails to take into account some of the hallmark differences between copyright law and patent law. For example, as previously noted, patent law receives one-fifth of the term of a copyright. However, the scope of the patent rights are more absolute. Introduction of a fair use doctrine in patent law without a corresponding increase in the term of the patent undermines some of the incentives of patents. Unlike copyrighted subject matter, patents generally require a greater up-front investment and more scrutiny before the right is granted.³³³ Moreover, society has a corresponding interest in bringing inventions to the public domain more quickly than copyrights.

3. Proposal: Experimentation Exemption with Compulsory Licensing

Katherine Strandburg proposed a more middle of the road approach: a exemption for experimentation regardless of the motivation.³³⁴ Her proposal differentiates between "experimenting on" a patented invention and "experimenting with" a research tool.³³⁵ The "experimenting on" idea continues the progress of science. Under the "experimenting with" provision, she proposed either a compulsory licensing scheme or a straight exemption for non-profit entities.³³⁶ However, an exemption for non-profit entities is problematic for a number of reasons, leaving the compulsory licensing scheme as the better alternative.³³⁷ Under a compulsory licensing scheme, anybody should be able to use and have access to the tool provided that they are willing to pay the licensing fee.³³⁸

Strandburg's proposal solves many of the problems discussed previously regarding the externalities accompanying transfer of research tools. However, it also deprives patent holders of the right to set their price for their invention. In effect, it assumes that research tools have relatively the same value; in reality, research tools *54 cover a wide range of values and development costs. Tools that cost more to develop should naturally cost more to use, which makes the calculation of royalties on externalities in and of itself problematic. Moreover, not all research tools are alike. Some tools are quite specialized, restricting the potential market and making the calculation of a royalty difficult. Conversely, broad spectrum tools have more universal appeal and can be marketed in numerous ways, from using a Cohen-Boyer-like paradigm to squeezing the market for every last cent that the tool can recover. Again, the source of the tool, whether a not-for-profit entity or private entity, and the nature of the tool create widely varying value.

4. Proposal: Non-commercial Use Research Exemption

Rochelle Dreyfuss suggested a research exemption for non-commercial uses of patented inventions.³³⁹ Dreyfuss's rationale is based on preserving the "public domain of science" in light of the scientific community's growing reliance on research tools.³⁴⁰ This proposal is problematic where the use of a research tool leads to the discovery of a commercially valuable invention. In such cases, the discoverer of the commercially valuable invention would be permitted to essentially "buyout" the use of the research tool.³⁴¹

C. The Outlook for Research Tools

Since 1984, the use of patented research tools has become more prominent in the pharmaceutical industry.³⁴² The temptation to use research tools will most likely continue to grow, especially as drug companies find new avenues for treating illness, including pharmacogenomics and gene therapy techniques.³⁴³ The industry thrives on the cutting edge of innovation, which makes the incentive to use patented research tools more tempting.³⁴⁴ As inventors become more apt to protect research tools and pharmaceutical companies continue to explore new ways to save time and costs in the pursuit to bring new drugs to market, the courts are increasingly likely to be forced to grapple with the research tool patent problem.

*55 As previously noted, the Federal Circuit, in dicta indicated that research tools are in-bounds,³⁴⁵ and the Supreme Court declined to comment.³⁴⁶ The official position of the Federal Circuit is still the plain language approach adopted in *AbTox* and *Chartex*, which theoretically exempts patented research tools from infringement, provided the use is reasonably related to the development of information for FDA approval. The Federal Circuit is unlikely to reverse entirely and adopt the symmetry principle because of precedent and the uncertainty that such a reversal would bring, especially as it relates to medical devices.³⁴⁷

1. Positive Effects of Greater Predictability for Research Tools

A more focused application of § 271(e)(1) solely to drugs and Class III medical devices (i.e. subject matter eligible for term extension under § 156) would improve the predictability by clearly drawing a bright line as to the scope of the safe harbor in

§ 271(e)(1). This benefits the research and development community in multiple ways. First, more aggressive development of research tools may result from the increased incentives, especially for those tools that increase efficiency in the testing phases of pharmaceuticals. Moreover, such technologies may actually reduce the cost of drugs and their generic counterparts. An extra week on the market for a \$1 billion a year drug earns a company \$19.2 million. Because these costs often reflect the cost of research and development, which was recently measured to average \$800 million per drug,³⁴⁸ an extra week of marketability may actually mean a net savings in the cost per prescription to consumers by allowing the pioneer pharmaceutical company to recoup on research and development costs sooner. Thus, even with licensing agreements, pioneer pharmaceutical companies could save millions of dollars by bringing drugs to market more rapidly. Further, with increased incentives to create tools that expedite the process of research, development, and clinical trials, aggressive development of these sorts of research tools may become the rule.

The second way that increased predictability would benefit the research, development, and testing community is by providing more powerful tools to collect and interpret data. Such tools may be more powerful in detecting adverse effects of drugs and medical devices that would otherwise only be detected in after-market testing. For example, DNA microarrays can rapidly screen drug interactions, and may eventually be available to determine adverse effects on a genomic level on a ***56** patient-by-patient basis.³⁴⁹ This could potentially make drugs and devices safer for consumers and could potentially provide drugs optimized to the patient. This is only one example of how acceleration of the research tool industry could benefit consumers.

Lastly, research tools that help bring pioneer pharmaceuticals to the market more quickly will not necessarily bring generic drugs and devices to market more quickly.³⁵⁰ However, as with pioneer drugs and devices, the cost of generic drugs to the consumer can likely be reduced with more effective research tools. Consequently, there are at least three reasons why increasing the predictability of § 271(e)(1) may potentially bring savings to both the pharmaceutical industry and consumers. On the other hand, strengthening the § 271(e)(1) safe harbor may also lead to the opposite result.

2. Negative Effects of Stronger Patent Protection for Research Tools

As research tools become increasingly useful to research and development companies, including pharmaceutical companies, they become more valuable. The problem with the tools is that inventors of research tools may tend to overvalue their inventions.³⁵¹ This in turn increases the cost to license the tool. Moreover, inventors may also demand other rights in the downstream inventions.³⁵² Pharmaceuticals, naturally, are the golden egg for tool inventors, because they are downstream inventions that can potentially make billions of dollars.³⁵³ In such scenarios, the research tool inventor seeks a large reward, often in the form of reach through or downstream royalties,³⁵⁴ but takes none of the risks associated with the development of the drug or device.³⁵⁵ Moreover, universities and other not-for-profit research ***57** entities may not be able to afford these sorts of high-priced tools.³⁵⁶ This fact is especially ironic considering that the creation of many research tools, particularly in the biotechnology area, are funded by federal grants.

In addition to cost barriers, the inventors of research tools can actually impede the progress of downstream research, through the so-called “blocking” effect.³⁵⁷ This occurs when the patented invention is necessary to conduct the downstream research.³⁵⁸ Reasons for this type of barrier to downstream research may be to preserve the competitive edge of the inventing entity or because of problems with negotiating licensing terms.³⁶⁰

Closely related to imposition of the progress of downstream research and development are the anticommons of biotechnology.³⁶¹ This results when a downstream invention requires numerous patented inventions, possibly including research tools, in order to pursue the goals of the research.³⁶² This leads to excessive cost and time to obtain licenses for each patented component, as well as the possibility that a single inventor can cripple the entire research process by withholding a license to use a necessary component. Moreover, the variety of different players, with differing interests, including “university administrators, research faculty, biotechnology research firms, large pharmaceutical companies, and government laboratories” complicate the licensing process and may eventually stall it altogether.³⁶³

CONCLUSION

Research tools continue to become a more difficult problem, both generally and under Hatch-Waxman. Integra is not the first case, albeit the most prominent case to date, nor will it be the last to deal with the problems of research tools under the Hatch-Waxman Act. These problems may be difficult to solve without Congressional intervention. Moreover, because the

problem is relatively new, attempts to correct the problems without long-term studies may end up exacerbating the problem rather than correcting it. Nevertheless, with respect to the research tool problem as it relates to § 271(e)(1), the problem may be more straightforward.

In 1984, there was no way for Congress to predict the potential effect of the Bolar Amendment on patented research tools arising from the sudden growth in the *58 biotechnology industry and in the protection of intellectual property. This lack of foresight leaves the issue of patented research tools unresolved in light of *Integra*, where the Supreme Court has implicitly decided to let Congress address the problem by standing by the plain language of § 271(e)(1). Since the passage of Hatch-Waxman, courts have steadily expanded the scope of § 271(e)(1) relying on the plain language as set forth by the Supreme Court in *Eli Lilly*. The Federal Circuit upheld this principle in its cases. However, one can reasonably argue that research tools are outside the scope of the safe harbor based on the legislative history, but within the scope according to the plain language.

Currently, under a literal reading and logical analysis of the Supreme Court and Federal Circuit decisions, the statute exempts otherwise infringing uses of research tools pursuant to FDA approval of a new or generic drug or device. Until either Congress or the courts address the problem, pharmaceutical companies, both pioneer and generic, appear to have a green light to use patented research tools license free in their pursuit of FDA approval.

Footnotes

^{a1} Associate at Greenberg Traurig, LLP, in Orange County, California; LL.M., Intellectual Property Law, The George Washington University Law School; J.D., Arizona State University; M.S. in Molecular Biology, Brigham Young University; B.S., Brigham Young University. The author would like to thank the Honorable Gerald J. Mossinghoff for his suggestions relating to the subject matter of this paper.

¹ *Merck KGaA v. Integra Lifesciences I, Ltd.*, 125 S. Ct. 2372 (2005).

² 35 U.S.C. § 271(e)(1) (2000).

³ Pub. L. No. 98-417, 98 Stat. 1585 (1984).

⁴ A drug shall be considered to be bioequivalent to a listed ... drug if -
(i) the rate and extent of absorption of the drug do not show ... a significant difference from the rate and extent of absorption...of the listed drug when administered at the same molar dose of ... the therapeutic ingredient under similar experimental ... conditions in either a single dose or multiple doses; or ...
(ii) the extent of absorption of the drug does not show a ... significant difference from the extent of absorption of the ... listed drug when administered at the same molar dose of the ... therapeutic ingredient under similar experimental conditions in ... either a single dose or multiple doses and the difference from ... the listed drug in the rate of absorption of the drug is ... intentional, is reflected in its proposed labeling, is not ... essential to the attainment of effective body drug ... concentrations on chronic use, and is considered medically ... insignificant for the drug.
21 U.S.C. § 355(j)(8)(B) (2003).

⁵ *Nicholas Groombridge & Sheryl Calabro, Integra Lifesciences v. Merck--Good for Research or Just Good for Research Tool Patent Owners?*, 22 *Biotechnology L. Rep.* 462, 462, 470 (2003). See also, *Discover a New World of Information*, <http://www.thomsonpharma.com/abouttp/> (last visited Dec. 2, 2005) (new startup venture that aims to combine pharmaceutical research, development, and testing, with new discoveries and tools in the sciences).

⁶ See generally *Groombridge & Calabro*, supra note 5, at 462 (noting importance of enforceability of research tool patents to research tool reliant pharmaceutical industry).

⁷ Jian Xiao, *Carving Out a Biotechnology Research Tool Exception to the Safe Harbor Provision of 35 U.S.C. § 271(e)(1)*, 12 *Tex.*

Intell. Prop. L.J. 23, 55 (2003).

⁸ See generally Richard J. Warburg et al., Patentability and Maximum Protection of Intellectual Property in Proteomics and Genomics, 22 *Biotechnology L. Rep.* 264, 264 (2003).

⁹ *Id.* at 265-66. For a more inclusive list of research tools potentially affected by the safe harbor of the Hatch-Waxman Act, see Donald R. Ware, Research Tool Patents: Judicial Remedies, 30 *AIPLA Q.J.* 267 (2002). See also Adrian Zahl, Patenting of “Higher Life Forms” in Canada, 23 *Biotechnology L. Rep.* 556 (2004); Stephen G. Kunin & Linda S. Therkorn, Workshop on Future Public Policy and Ethical Issues Facing the Biotechnology Industry, 88 *J. Pat. & Trademark Off. Soc’y* 501, 501 (2004); Groombridge & Calabro, *supra* note 5, at 462; Report of the National Institutes of Health (NIH) Working Group on Research Tools, Background (June 4, 1998), [http:// www.nih.gov/news/researchtools/](http://www.nih.gov/news/researchtools/) [hereinafter NIH Report].

¹⁰ See *infra* Part III.

¹¹ NIH Report, *supra* note 9, at Background.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.* at Competing Interests at Stake.

¹⁵ *Id.*

¹⁶ *Id.* at Scientists as Importers of Research Tools.

¹⁷ See Comm. on Intellectual Prop. Rights in the Knowledge-Based Econ., Nat’l Research Council, *A Patent System for the 21st Century* 28 (Stephen A. Merrill et al. eds., The National Academies Press 2004), available at <http://www.nap.edu/html/patentsystem/0309089107.pdf> [hereinafter Patent System] (noting that “most research tools are created simply to facilitate a research objective”).

¹⁸ NIH Report, *supra* note 9, at Private Firms.

¹⁹ *Id.* at Therapeutic Compounds as Research Tools, Biologicals and Drug Targets as Research Tools.

²⁰ *Id.* at Broad Spectrum Research Tools.

²¹ *Id.*

²² *Id.*

²³ *Id.* See also Heather Hamme Ramirez, Comment, Defending The Privatization of Research Tools: An Examination of the “Tragedy of the Anticommons” in Biotechnology Research and Development, 53 *Emory L.J.* 359, 374-78 (2004).

24 NIH Report, *supra* note 9, at Broad Spectrum Research Tools.

25 Ramirez, *supra* note 23, at 374-76.

26 *Id.*

27 *Id.* at 375 n.133.

28 *Id.* at 374-76.

29 See *id.* at 376-78 (reviewing the strategy employed by Cetus).

30 *Id.*

31 Ramirez, *supra* note 23, at 376-77.

32 U.S. Const. art. I, § 8, cl. 8.

33 See NIH Report, *supra* note 9, at Competing Interests at Stake.

34 *Id.* See also Ramirez, *supra* note 23, at 374-78 (comparing strategies employed in the Cohen-Boyer patents, which originated at a university, and the PCR patents, which were developed by a private company).

35 NIH Report, *supra* note 9, at Importing Research Tools from Universities.

36 *Id.*

37 *Id.* at Private Firms.

38 See Patent System, *supra* note 17, at 71 (noting that universities may overvalue their research tools just as private companies or government entities do).

39 *Id.*

40 See *id.* (noting that a research tool holder may insist on reach-through rights or downstream royalties).

41 For example, the Cohen-Boyer patents and PCR made recombinant DNA research possible.

42 NIH Report, *supra* note 9.

43 Bayh-Dole University and Small Business Patent Procedures Act, 35 U.S.C. §§ 200-211 (2000).

44 NIH Report, *supra* note 9, at Importing Research Tools from Universities.

45 See generally *id.*

46 *Id.* at Importing Research Tools from Universities.

47 *Id.* at Administrative Burden and Resulting Delays.

48 *Id.*

49 *Id.*

50 NIH Report, *supra* note 9, at Delays and Restrictions on Publication.

51 *Id.*

52 *Id.* (“Limitations of publication or other dissemination of the results of university research are a major concern of universities Freedom to publish and talk about research results is obviously a cherished value within the academic community and central to the progress of science.”).

53 *Id.* at Rights to Future Intellectual Property.

54 35 U.S.C. § 202(a) (2000).

55 NIH Report, *supra* note 9, at Rights to Future Intellectual Property.

56 *Id.*

57 *Id.* (“Many universities distinguish between future discoveries that actually incorporate the research tool ... and discoveries that merely result from past use of the research tool.”).

58 *Id.*

59 *Id.*

60 See 35 U.S.C. § 202 (2000). Bayh-Dole requires an agreement between the funding agency and the investigator, which requires that after a discovery is made where federal funds sponsored the research, the investigator must report the discovery to the funding agency. *Id.* § 202(c)(1). After reporting, the investigator may elect to retain title to the invention. *Id.* § 202(c)(2).

61 See *id.* § 202(c)(6) (noting that any funding agreement between a university and a funding agency obligates the university to specify on a United States patent application that “the invention was made with Government support and that the Government has

certain rights in the invention”).

62 NIH Report, supra note 9, at Rights to Future Intellectual Property.

63 Id.

64 Id.

65 Id.

66 Id. at Restrictions on Use of Research Tools.

67 Id.

68 NIH Report, supra note 9, at Indemnification.

69 Id.

70 Id. at Exporting of Research Tools by Universities. The NIH Report stated that the following types of terms are objected to in incoming licenses and MTAs, but are often included as part of outgoing licenses and MTAs: requirements to submit manuscripts to the provider for review and comment for a specified period prior to submission for publication or other disclosure, and to delay release for a further period of time to permit the provider to file a patent application; broad definitions of the material owned by the provider that include derivatives; allocations to the provider of ownership in future discoveries made through use of the materials; rights of first refusal for the provider to license subsequent discoveries; prohibitions on use in research that is subject to licensing obligations to another institution; prohibitions on commingling the material and derivatives with other biological material without written permission from the provider; prohibitions on transfer to other investigators or other institutions; and indemnification clauses that hold the provider harmless against liability....
Id.

71 Id.

72 Id. at Importing Research Tools from Universities.

73 Id.

74 NIH Report, supra note 9, at Importing Research from Universities.

75 Id. at Benefits to Firms.

76 Id.

77 Id.

78 Id. This relationship potentially leads to both collaboration with cutting edge developments in the science, as well as access to tools developed at the university.

79 Id. at Risks to Firms. The NIH Report states that some firms use surreptitious means to acquire the tools of competitors such as using graduate students to seek access to the tools.

80 NIH Report, supra note 9, at Risks to Firms.

81 Id.

82 Id. at Therapeutic Compounds as Research Tools.

83 Id. at Biologicals and Drug Targets as Research Tools.

84 Id. at Broad Spectrum Research Tools.

85 Id. at Therapeutic Compounds as Research Tools.

86 NIH Report, supra note 9, at Therapeutic Compounds as Research Tools.

87 See America's 100 Best, Reader's Dig., May 2005, at 157 (noting how the Institute for OneWorld Health develops cures for developing-world diseases from compounds held under patents donated by pharmaceutical companies).

88 NIH Report, supra note 9, at Biologicals and Drug Targets as Research Tools.

89 Id.

90 However, this is not always the case. The Cohen-Boyer patents are a classic example of making extremely important research tools broadly available at a reasonable price.

91 NIH Report, supra note 9 at Broad Spectrum Research Tools.

92 Id.

93 *Eli Lilly & Co. v. Medtronic, Inc.*, 496 U.S. 661, 679 (1990).

94 35 U.S.C. § 271(e)(1) (2000).

95 Generic Animal Drug and Patent Term Restoration Act, Pub. L. No. 100-670, § 201(i)(2)(A), 102 Stat. 3971 (1988) (codified in 35 U.S.C. § 271(e)(1)).

96 Food, Drug, and Cosmetic Act, 21 U.S.C. §§ 321-399 (1984).

97 Warburg et al., *supra* note 8, at 264-66.

98 See generally Ware, *supra* note 9; Zahl, *supra* note 9; Kunin & Therkorn, *supra* note 9; Groombridge & Calabro, *supra* note 5; NIH Report, *supra* note 9.

99 See generally Elizabeth Stotland Weiswasser & Scott D. Danzis, *The Hatch-Waxman Act: History, Structure, and Legacy*, 71 *Antitrust L.J.* 585 (2003).

100 See 130 Cong. Rec. 23061 (1984) (statement of Rep. Hyde) (noting that since seven to ten years was required to complete the regulatory review process, the patent term exclusivity of seventeen years was reduced by this amount).

101 *Eli Lilly & Co. v. Medtronic, Inc.*, 496 U.S. 661, 670 (1990).

102 Weiswasser & Danzis, *supra* note 99, at 588-90.

103 130 Cong. Rec. 23065 (1984) (statement of Rep. Feighan).

104 See Generic Pharmaceutical Association, *Generic Pharmaceutical Facts at a Glance*, http://www.gphaonline.org/AM/Template.cfm?Section=Media_Kit&Template=/CM/ContentDisplay.cfm&ContentID=2235 at 3 (last visited March 13, 2006).

105 See Weiswasser & Danzis, *supra* note 99, at 588-90 (noting the situation of generic drugs prior to Hatch-Waxman).

106 130 Cong. Rec. 23065 (1984) (statement of Rep. Rodino).

107 *Id.*

108 *Id.*

109 Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585.

110 130 Cong. Rec. 23059 (1984) (statement of Rep. Waxman).

111 35 U.S.C. § 156 (2000). See also Elizabeth Weir, *House Passes Drug Bill That Could Cut Costs*, 42 Cong. Q. 2184, 2184 (1984); Elizabeth Weir, *Major Drug Legislation Cleared by Congress*, 42 Cong. Q. 2241, 2241 (1984).

112 Food, Drug, and Cosmetic Act, 21 U.S.C. §§ 321, 331-337, 341-364, 371-379, 381-384, 391-399 (1984).

113 Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, § 101, 98 Stat. 1585, 1585-97.

114 Weiswasser & Danzis, *supra* note 99, at 588-90.

115 Weiswasser & Danzis, *supra* note 99, at 604-06.

116 733 F.2d 858 (Fed. Cir. 1984).

117 *Id.* at 863.

118 Weiswasser & Danzis, *supra* note 99, at 586-89, 605. In 1970, the FDA started to require ANDA applications from generic drug manufacturers. *Id.* at 589. Unlike today, in which an ANDA need only show bioequivalency to a patented counterpart of the generic version seeking FDA approval, the 1970 rules only required that the generic manufacturer generate and submit information showing the generic version's active ingredient was not unsafe or ineffective. *Id.* at 586, 589.

119 The Bolar Amendment was not part of the original compromise between pioneer drug companies and generic drug companies. Weiswasser & Danzis, *supra* note 99, at 605.

120 35 U.S.C. § 271(e)(1) (2000).

121 Weiswasser & Danzis, *supra* note 99, at 595.

122 *Id.* at 599.

123 *Id.*

124 § 355(b)(2)(A) (requiring that a generic manufacturer certify that a drug is either not patented, based on an expired patent, patented, or based on a patent that is invalid). Certifications with respect to patent invalidity cause significant controversy that can lead to litigation. Weiswasser & Danzis, *supra* note 99, at 600.

125 See *infra* Part II.A.3.ii (Passage through the Senate and Presidential Signature).

126 The Senate ratified the bill with little opposition other than procedural and policy statements made by a handful of Senators. 130 Cong. Rec. 24970-79 (1984). Representatives Moorehead, Hyde, DeWine, Kindness, Rodino, and Weiss rose in opposition to the inclusion of § 202 of the bill, which was codified as 35 U.S.C. § 271. The Representatives argued that allowing generic drug companies to make use of patented drugs with the end goal of FDA approval was unconstitutional, as it deprived the patent holder of their constitutionally guaranteed right to exclusivity. 130 Cong. Rec. 23057-65; 130 Cong. Rec. 24456-58. See also H.R. Rep. No. 98-857, pt. 2, at 60-61 (1984). But see H.R. Rep. No. 98-857, pt. 2, at 27-30 (noting that the provisions of the new bill, which allowed limited testing of patented drugs in order to assist generic drug manufacturers in preparing an ANDA, did not constitute a “‘taking’ without just compensation” in violation of the Fifth Amendment under Supreme Court precedent).

127 See 130 Cong. Rec. 24457 (statement of Representative Weiss). Representative Weiss indicated that the passage of the Hatch-Waxman Act was unlikely in the form the Senate passed. Thus, “Chairman Waxman engaged in extensive negotiations with representatives of the brand-name generic drug companies in order to craft a workable compromise that would satisfy all interested parties.” *Id.*

128 See 130 Cong. Rec. 23057-58 (statement of Representative Waxman) (“[T]his bill fairly and carefully balances the public’s need for low-cost generic drugs and private industry’s need for sufficient patent life to encourage the development of innovative products such as drugs.”).

129 130 Cong. Rec. 23104-08.

- ¹³⁰ H.R. Rep. No. 98-857, pt. 2, at 7-10. Representative Kindness took special exception to the notion of a “negotiated” bill. He stated, “There is nothing wrong with negotiations ... [b]ut when you substitute somebody’s statement that ‘Oh, you cannot touch a tiddle in this bill because it has all been carefully negotiated and balanced and set forth in such a manner that if anybody slips a little bit, the whole thing falls.’ ... Anyone who has been involved in the legislative process for any appreciable period of time or has observed it closely knows that every time that argument is made it is false.” 130 Cong. Rec. 23063-64.
- ¹³¹ H.R. Rep. No. 98-857, pt. 2, at 8-9; 130 Cong. Rec. 23104-08 (Representative Kindness bypassed the Judiciary Committee and introduced his amendment on the House floor.).
- ¹³² H.R. Rep. No. 98-857, pt. 2, at 8-9.
- ¹³³ 130 Cong. Rec. 23062 (statement of Representative Moorehead).
- ¹³⁴ H.R. Rep. No. 98-857, pt. 2, at 27-30. The Judiciary Committee evaluated the constitutionality of § 202 and found that the interference to the rights of the patent holder to be de minimis because the FDA approval requirements for an ANDA led to a de facto term extension, which prevented competitors from entering the market at the end of the applicable patent term. Section 202 furthers the public policy that a patent should be exclusive only for the patent term.
- ¹³⁵ 130 Cong. Rec. 23106-08 (amendment by Representative Kindness).
- ¹³⁶ Id. at 23108. If the Kindness Amendment had passed, § 271(e)(1) would have read:
As to patents issued after the effective date of this subsection and the terms of which are eligible for extension under section 156 of this title, it shall not be an act of infringement to make, use, or sell a patented invention (other than a new animal drug or veterinary biological product (as those terms are used in the Federal Food, Drug, and Cosmetic Act and the Act of March 4, 1913) which is primarily manufactured using recombinant DNA, recombinant RNA, hybridoma technology, or other processes involving site specific genetic manipulation techniques) 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 or veterinary biological products.
(emphasis added).
- ¹³⁷ The debate in which the amendment was introduced under clause 6 of House Rule XXIII consisted of 9 members of the House. The Committee of the whole House is on record as coming to no resolution with respect to the amendments. 130 Cong. Rec. 23063.
- ¹³⁸ Id. at 23106-08.
- ¹³⁹ 130 Cong. Rec. S8915 (1984). The Senate considered the original bill on June 29, 1984.
- ¹⁴⁰ See S. 1538, 98th Cong. (1984).
- ¹⁴¹ See supra Part II.A.3.i (Passage through the House of Representatives).
- ¹⁴² Senator Byrd insisted that the bill be reintroduced in the Senate with no amendments. 130 Cong. Rec. 24970 (1984). Senator Metzenbaum took issue with the fact that the bill was perceived as “pro-generic,” but nevertheless supported the passage of the bill. Id. at 24979.
- ¹⁴³ Ronald Reagan, 1984 Pub. Papers 2, 1362.

144 Id.

145 Id.

146 See, e.g., *AbTox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1029 (Fed. Cir. 1997) (showing the holdings of *Eli Lilly* to be inconsistent with each other in light of application to Class I and II medical devices). See also *Intermedics, Inc. v. Ventritex, Inc.*, 775 F. Supp. 1269 (N.D. Cal. 1991), *aff'd*, 991 F.2d 808 (Fed. Cir. 1993); *Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc.*, No. 95 Civ. 8833(RPP), 2001 WL 1512597 (S.D.N.Y. Nov. 28, 2001) (unpublished opinion), *aff'd* on other grounds, 326 F.3d 1226 (Fed. Cir. 2003); *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860 (Fed. Cir. 2003), *vacated*, 125 S. Ct. 2372 (2005).

147 See, e.g., Paul Fehlner, *Not Such a Safe Harbor After All*, 10 No. 6 *Andrews Intell. Prop. Litig. Rep.* 18 (July 22, 2003) (noting that the Hatch-Waxman Act has been construed broadly to include medical devices and experiments).

148 496 U.S. 661 (1990).

149 *Id.* at 664.

150 21 U.S.C. § 355 (2003).

151 35 U.S.C. § 271(e)(1) (2000).

152 *Eli Lilly*, 496 U.S. at 666.

153 *Id.* at 666-67.

154 *Id.* at 666.

155 *Id.* at 666-70. Justice Scalia pointed out that there were two possible ways of reading this statute. First, it could be viewed as referring to any “statutory scheme of regulation” that included as one of its components drugs, or conversely, that it could be read to apply to sections of federal statutes dealing with drugs. The Court suggested that if Congress intended § 271(e)(1) to read as only those sections of federal statutes dealing with drugs, the statutory language more naturally would have read, “It shall not be an act of infringement to make, use, or sell a ... patented invention for [a] drug product, drug composition, or drug use.” *Id.* at 667-68.

156 *Id.* at 669-70.

157 *Id.* at 673.

158 *Eli Lilly*, 496 U.S. at 671-73.

159 *Intermedics, Inc. v. Ventritex, Inc.*, 775 F. Supp. 1269 (N.D. Cal. 1991), *aff'd*, 991 F.2d 808 (Fed. Cir. 1993).

160 Id. at 1278.

161 Id.

162 Id. at 1280.

163 Id.

164 Chartex Int'l PLC v. M.D. Pers. Prods. Corp., No. 92-1556, 1993 WL 306169, at *4 (Fed. Cir. Aug. 12, 1993) (unpublished opinion).

165 Id. at *2 n.2.

166 AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1029 (Fed. Cir. 1997).

167 35 U.S.C. § 156(a)(4) (2000).

168 AbTox, 122 F.3d at 1028-29.

169 Id. at 1027-30.

170 Id. at 1028.

171 Id. at 1029.

172 Id. at 1029.

173 Id. at 1030.

174 Infigen, Inc. v. Advanced Cell Tech., Inc., 65 F. Supp. 2d 967 (W.D. Wis. 1999).

175 Id. at 980.

176 Infigen, 65 F. Supp. 2d at 980.

177 Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc., No. 95 Civ. 8833(RPP), 2001 WL 1512597 (S.D.N.Y. Nov. 28, 2001) (unpublished opinion), aff'd on other grounds, 326 F.3d 1226 (Fed. Cir. 2003).

178 Id. at *2. The district court relied on previous Federal Circuit precedent that § 271(e)(1) "means all patented inventions or discoveries, and not merely those that are covered by section 156." Id. at *3.

179 Id. at *3 n.6.

180 Id. at *6.

181 *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860 (Fed. Cir. 2003), vacated, 125 S. Ct. 2372 (2005).

182 See Edward T. Lentz, *Pharmaceutical and Biotechnology Research After Integra and Madey*, 23 *Biotech. L. Rep.* 265 (2004). “The holding and rationale of *Integra* seem to be at odds with previous Federal Circuit and District Court case law [T]he Federal Circuit and multiple District Courts adopted a much more liberal construction of the 271(e)(1) exemption.” Id. at 267.

183 *Integra*, 331 F.3d at 867-68. But see *Bristol-Myers*, 2001 WL 1512597, at *4 (holding that the use of a patented invention to screen for potential drug candidates was within the scope of § 271(e)(1)).

184 Id. (emphasis added). Congress added § 271(e)(1) after the main quid pro quo (term extension and changes to the FDCA to make ANDA approval available to generic manufacturers) to take care of the de facto term extension.

185 See *Intermedics, Inc. v. Ventritex, Inc.*, 775 F. Supp. 1269, 1280 (N.D. Cal. 1991), aff’d, 991 F.2d 808 (Fed. Cir. 1993) (discussing the reasonably related test).

186 Stephen A. Becker, *1 Patent Applications Handbook* § 3:19 (2005 ed.). “[T]he Federal Circuit held that the exemption is limited to uses reasonably related only to the development and submission of information for FDA safety and effectiveness approval process.” Id. (emphasis added).

187 See *Merck KGaA v. Integra Lifesciences I, Ltd.*, 125 S. Ct. 2372, 2383 (2005) (noting that Congress extended §271(e)(1) protection to “all uses ... ‘reasonably related’ to [the development of] information for submission under any federal law regulating ... drugs”).

188 Id. The general disposition of the court affirmed the plain language of the statute. See id. at 2382-84. The court simply required that activity in question simply be reasonably related to the submission of information under any law regulating drugs. See id. at 2380-83. But the holding is somewhat confusing because the Court also stated that the information submitted must be pursuant to the submission of an IND or an NDA (and presumably ANDAs). Id. at 2383-84.

189 Id. at 2382-83.

190 Id. at 2382 n.7. In the Supreme Court’s defense, however, *Integra* did not argue that the patents in issue covered research tools or that Merck used them as research tools. Id. at 2382-84. Thus, the court did not comment on the applicability of § 271(e)(1) to research tools.

191 Id. at 2382.

192 See id. at 2383.

193 E.g., *Patent System*, supra note 17, at 82 (advocating exemption “for noncommercial uses of patented inventions ... strictly limited to research”).

194 *Whittemore v. Cutter*, 29 F. Cas. 1120, 1121 (C.C.D. Mass. 1813) (“[I]t could never have been the intention of the legislature to punish a man ... for the purpose of ascertaining the sufficiency of the machine to produce its desired effect.”).

195 Madey v. Duke Univ., 307 F.3d 1351, 1361 (Fed. Cir. 2002).

196 H.R. 5598, 101st Cong. § 402 (1990). The bill sought to codify a general research exemption in the following language:
[section 271(j)] It shall not be an act of infringement to make or use a patented invention solely for research or experimentation purposes unless the patented invention has a primary purpose of research or experimentation.
If the patented invention has a primary purpose of research or experimentation, it shall not be an act of infringement to manufacture or use such invention to study, evaluate, or characterize such invention or to create a product outside the scope of the patent covering such invention. This subsection does not apply to a patented invention to which subsection (e)(1) applies.

197 Id.

198 H.R. Rep. No. 101-960, at Title IV (1990).

199 See, e.g., To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy, A Report by the Federal Trade Commission (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf>; NIH Report, supra note 9, at Analysis of NIH Options Under Current Law; Patent System, supra note 17, at 11.

200 See The National Academies' Board on Science, Technology, and Economic Policy et al., Town Hall Meeting on Patent Reform in Boston, Mass. (Mar. 18, 2005) (on file with author) [hereinafter Boston Town Hall Meeting]; The National Academies' Board on Science, Technology, and Economic Policy et al., Town Meeting on Patent Reform in San Jose, Cal. (Feb. 18, 2005) (on file with author) [hereinafter San Jose Town Hall Meeting].

201 See The National Academies' Board on Science, Technology, and Economic Policy et al., Town Meeting on Patent Reform in Chicago, Ill. (Mar. 4, 2005) (on file with author) [hereinafter Chicago Town Hall Meeting].

202 Id.

203 See generally Boston Town Hall Meeting, supra note 200; San Jose Town Hall Meeting, supra note 200; Chicago Town Hall Meeting, supra note 201.

204 Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 665 (1990).

205 Merck KGaA v. Integra Lifesciences I, Ltd., 125 S. Ct. 2372, 2383 (2005).

206 See, e.g., Intermedics, Inc. v. Ventritex, Inc., 775 F. Supp. 1269, 1287 (N.D. Cal. 1991), aff'd, 991 F.2d 808 (Fed. Cir. 1993); NeoRX Corp. v. Immunomedics, Inc., 877 F. Supp. 202, 206-07 (D.N.J. 1994) (permitting some latitude in the application of "reasonably related"); AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1029-30 (Fed. Cir. 1997); Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 864-68 (Fed. Cir. 2003), vacated, 125 S. Ct. 2372 (2005); Integra, 125 S. Ct. at 2382-83.

207 See Chartex Int'l PLC v. M.D. Pers. Prods. Corp., No. 92-1556, 1993 WL 306169, at *2 (Fed. Cir. Aug. 12, 1993) (unpublished opinion); Bristol-Myers Squibb Co. v. Rhone-Poulenc Rorer, Inc., No. 95 Civ. 8833(RPP), 2001 WL 1512597, at *2-3 (S.D.N.Y. Nov. 28, 2001) (unpublished opinion), aff'd on other grounds, 326 F.3d 1226 (Fed. Cir. 2003).

208 See e.g., Eli Lilly, 496 U.S. at 669 (dismissing legislative history arguments as unclear).

209 Thus, the generic manufacturer's benefit arising from Hatch-Waxman's quid pro quo was not primarily to overturn Roche.

210 In the original Senate version of the bill, the Bolar Amendment was absent. The House of Representatives added it to avoid giving pioneer drug manufacturers a term extension to their patent term.

211 See supra Part II.A.2.

212 Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, § 202, 98 Stat. 1585 (1984).

213 § 202, 98 Stat. at 1603.

214 130 Cong. Rec. 23057 (1984) (statement of Representative Waxman).

215 Weiswasser & Danzis, supra note 99, at 590.

216 For a detailed examination of the scope of “reasonably related,” see supra Part II.A.4.i and ii.

217 For a detailed list of research tools that can be used in pharmaceutical applications, see Warburg et al., supra note 8, at 266. See also Cathryn Campbell & R. V. Lupo, Exemption to Patent Infringement Under 35 U.S.C. Section 271(e)(1): Safe Harbor or Storm A-Brewing?, 5 Sedona Conf. J. 29, 34 (2004); Groombridge & Calabro, supra note 5, at 462, 468-71.

218 This logic follows from the fact that if a use is not reasonably related to the generation and development of data pursuant to FDA approval, the particular invention for which the otherwise infringing use is made is irrelevant--the safe harbor will not shield the infringement. See Xiao, supra note 7, at 37-40.

219 Merck KGaA v. Integra Lifesciences I, Ltd., 125 S. Ct. 2372, 2380 (2005).

220 Id.

221 Congress never directly addressed research tools as part of the scope of Hatch-Waxman.

222 Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, § 201, 98 Stat. 1585 (1984).

223 Generic Animal Drug and Patent Term Restoration Act, Pub. L. No. 100-670, § 201(i)(1)(A), 102 Stat. 3971 (1988) (codified in 35 U.S.C. § 271(e)(1)). Congress further restricted animal drugs and veterinary biological products with the phrase “which is primarily manufactured using recombinant DNA, recombinant RNA, hybridoma technology, or other processes involving site specific genetic manipulation techniques[.]” 35 U.S.C. § 271(e)(1).

224 H.R. Rep. No. 98-857, pt. 1, at 20 (1984). In one instance “medical devices” were also considered, but it is the only reference found in the legislative history that deviates from the word “drug” and its derivations.

225 See 130 Cong. Rec. 23057-65 (1984).

226 Id.

227 Id.

228 H.R. Rep. No. 98-857, pt. 1, at 20 (1984); Xiao, *supra* note 7, at 56.

229 Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 665-74 (1990).

230 Id. at 672-73.

231 See *id.* at 670. The Supreme Court opined that Hatch-Waxman was designed to correct problems arising from the patent term lost while a drug awaited FDA approval, and the de facto patent term that a drug received while the generic version awaited FDA approval. Congress corrected the de facto term extension with both changes to the FDCA and the introduction of § 271(e)(1). *Id.* at 671-72.

232 Id. at 671-72 (emphasis added).

233 Merck KGaA v. Integra Lifesciences I, Ltd., 125 S. Ct. 2372, 2383 (2005).

234 None of these devices have an extensive regulatory approval process as required by § 156.

235 Eli Lilly, 496 U.S. at 672. The Court continued:
It seems most implausible to us that Congress, being demonstrably aware of the dual distorting effects of regulatory approval requirements in this entire area ... should choose to address both those distortions only for drug products; and for other products named in § 201 should enact provisions which not only leave in place an anticompetitive restriction at the end of the monopoly term but simultaneously expand the monopoly itself, thereby not only failing to eliminate but positively aggravating distortion of the [patent term].
Id. at 672-73.

236 See *AbTox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1029 (Fed. Cir. 1997) (noting that the Supreme Court's broad holding with respect to classes of inventions falling into the scope of § 271(e)(1) contradicts its narrow reasoning of statutory symmetry between §§ 271(e)(1) and 156).

237 Codified as 35 U.S.C. § 156 (2000).

238 Eli Lilly, 496 U.S. at 673.

239 See Hatch-Waxman Act, Pub. L. No. 98-417 § 201(f), 98 Stat. 1585, 1600-01 (1984). This argument logically follows from the structure of Hatch-Waxman. Title II contained definitions in § 201 (what is today 35 U.S.C. § 156). Section 202 of Hatch-Waxman became 35 U.S.C. § 271(e)(1).

240 Eli Lilly, 496 U.S. at 669.

241 § 156(f)(1).

242 § 156(f)(6).

243 § 156(f)(1). See also *Eli Lilly*, 496 U.S. at 669.

244 *Eli Lilly*, 496 U.S. at 671-72.

245 21 U.S.C. § 321 (2005).

246 See *id.* (Research tools are not mentioned within the statute.).

247 See *supra* Part II.A.1.

248 The Constitution guarantees a patent holder the right of exclusivity for limited times. U.S. Const. Art. I, § 8, cl. 8.

249 *Madey v. Duke Univ.*, 307 F.3d 1351, 1362 (Fed. Cir. 2002).

250 See, e.g., *id.*

251 Interview with Professor Lars Noah, Expert in FDA Law, Visiting Professor at the George Washington University, in Washington, D.C. (Sept. 17, 2004). The relevant topic was the intersection between patent law and FDA law. We discussed the safe harbor with respect to the fact that where drugs are concerned, there are two routes to exclusivity, patent law and the FDA approval process. There are few other instances in patent law where the market term is as impacted as it is with pharmaceuticals.

252 See 21 U.S.C. § 321 (2000) (A “device” must be either recognized by the Official National Formulary or United States Pharmacopeia; intended for use in diagnosis, cure, treatment, etc. of a disease; or intended to affect structure or function of man or other animals.).

253 See *supra* Part II.A.2.

254 H.R. Rep. No. 98-857, pt. 2, at 8-9, 27-30. The Judiciary Committee summarized the aims of Congress as it addressed the amendments to the Bolar Amendment. The amendments rested on the principle that the Constitution does not allow for exemption of the exclusive rights of patents.

255 See generally 130 Cong. Rec. 23057-65 (1984); 130 Cong. Rec. 24970-79 (1984).

256 *Groombridge & Calabro*, *supra* note 5, at 470. The blocking effect occurs when a research program depends on multiple patents. If a single patent holder refuses to grant an acceptable license, then the entire program fails. *Id.*

257 This result follows from economic theory. In theory, the pharmaceutical manufacturer will pass savings along to the consumer in an attempt to maximize profits.

258 *AbTox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1029 (Fed Cir. 1997).

259 See *supra* Part II.A.4.

260 *Merck KGaA v. Integra Lifesciences I, Ltd.*, 125 S. Ct. 2372, 2382 n.7 (2005); *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331

F.3d 860, 867 (Fed. Cir. 2003), vacated, 125 S. Ct. 2372 (2005).

261 733 F.2d 858 (Fed. Cir. 1984).

262 *Integra*, 331 F.3d at 864.

263 *Id.* at 867.

264 See *Roche*, 733 F.2d at 860.

265 See *supra* Part II.A.2.

266 *Integra*, 331 F.3d at 867.

267 For over twenty years, the scope of § 271(e)(1) steadily expanded. See Fehlner, *supra* note 147, at 18; George Fox, Note, *Integra v. Merck: Limiting the Scope of the 271(e)(1) Exception to Patent Infringement*, 19 *Berkeley Tech. L.J.* 193, 193-94 (2004).

268 H.R. Rep. No. 98-857, pt. 2, at 8-9, 27-30 (1984).

269 *Merck KGaA v. Integra Lifesciences I, Ltd.*, 125 S. Ct. 2372, 2382 (2005).

270 *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 867 (Fed. Cir. 2003), vacated, 125 S. Ct. 2372 (2005). See also David C. Hoffman, Note, *A Modest Proposal: Toward Improved Access to Biotechnology Research Tools by Implementing a Broad Experimental Use Exception*, 89 *Cornell L. Rev.* 993, 1036 (2004).

271 Hoffman, *supra* note 270, at 1036; Fox, *supra* note 267, at 213-15.

272 See *Integra*, 331 F.3d at 867. The Federal Circuit stated, “The 1984 Act was meant to reverse the effects of *Roche* under limited circumstances, not to deprive entire categories of inventions of patent protection.” *Id.*

273 *Embrex, Inc. v. Serv. Eng’g Corp.*, 216 F.3d 1343, 1352 (Fed. Cir. 2000) (Rader, J. concurring) (“[T]he Patent Act leaves no room for any de minimis or experimental use excuses for infringement. Because the Patent Act confers the right to preclude ‘use,’ not ‘substantial use,’ no room remains in the law for a de minimis excuse.”).

274 *Consumer Prod. Safety Comm’n v. GTE Sylvania, Inc.*, 447 U.S. 102, 108 (1980) (“Absent a clearly expressed legislative intention to the contrary, that language must ordinarily be regarded as conclusive.”). For more in depth analysis of the Plain Language Rule, see Robert J. Araujo, *The Use of Legislative History in Statutory Interpretation: A Look At Regent v. Bakke*, 16 *Seton Hall Legis. J.* 57 (1992); Morell E. Mullins, Sr., *Tools, Not Rules: The Heuristic Nature of Statutory Interpretation*, 30 *J. Legis.* 1 (2003); Randolph N. Jonakait, *The Supreme Court, Plain Meaning, and the Changed Rules of Evidence*, 68 *Tex. L. Rev.* 745 (1990).

275 130 *Cong. Rec.* 23061 (1984) (statement of Representative DeWine).

276 *Roche*, 733 F.2d at 861.

277 AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1029 (Fed. Cir. 1997); Chartex Int’l PLC v. M.D. Pers. Prods. Corp., No. 92-1556, 1993 WL 306169, at *2 (Fed. Cir. Aug. 12, 1993) (unpublished opinion).

278 AbTox, 122 F.3d at 1029; Chartex, 1993 WL 306169, at *2.

279 See supra Part II.A.2. for a discussion on the inventions eligible for term extension under § 156.

280 Merck KGaA v. Integra Lifesciences I, Ltd., 125 S. Ct. 2372, 2380-84 (2005); Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 671 (1990).

281 Eli Lilly, 496 U.S. at 670-72.

282 Id. at 666-67.

283 Id. at 665-66.

284 Id. at 665-71.

285 Id. at 671-72. The court endorsed the symmetry principle when it opined that the symmetry principle applies, and the exceptions will be rare; the Court rejected the plain language application by rejecting the argument where “disequilibrium becomes the general rule for patents relating to all products (other than drugs) named in 201 and subject to premarket approval under the FDCA.” Id.

286 AbTox, Inc. v. Exitron Corp., 122 F.3d 1019, 1029 (Fed. Cir. 1997).

287 See supra note 274.

288 Warburg et al., supra note 8, at 264-65; Campbell & Lupo, supra note 217, at 34.

289 See Eli Lilly, 496 U.S. at 672.

290 Merck KGaA v. Integra Lifesciences I, Ltd., 125 S. Ct. 2372, 2383 (2005).

291 Integra, 125 S. Ct. at 2382-84; Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 865-68 (Fed. Cir. 2003), vacated, 125 S. Ct. 2372 (2005).

292 Fox, supra note 267, at 204-05.

293 See supra Part II.B.3.iii.

294 Consumer Prod. Safety Comm’n v. GTE Sylvania, Inc., 447 U.S. 102, 108 (1980) (“Absent a clearly expressed legislative intention to the contrary, that language must ordinarily be regarded as conclusive.”).

295 See supra Part II.B.3.iii.

296 Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 672 (1990).

297 122 F.3d 1019 (Fed. Cir. 1997).

298 Id. at 1029.

299 Chartex Int'l PLC v. M.D. Pers. Prods. Corp., No. 92-1556, 1993 WL 306169 (Fed. Cir. Aug. 12, 1993) (unpublished opinion).

300 Merck KGaA v. Integra Lifesciences I, Ltd., 125 S. Ct. 2372, 2383 (2005).

301 Id.

302 Id. at 2383-84. The Court specifically included within the safe harbor activities necessary to submit an IND application. Id.

303 Because Class I and II medical devices are not eligible for term extensions under § 156. 35 U.S.C. § 156 (2000).

304 See Integra Lifesciences I, Ltd. v. Merck KGaA, 331 F.3d 860, 871 (2003) (noting the importance of research tools when applied to the drug development continuum), vacated, 125 S. Ct. 2372 (2005).

305 See supra Part II.A.2.

306 148 Cong. Rec. S11339-03 (2002).

307 Greater Access to Affordable Pharmaceuticals Act of 2003, S. 54, 108th Cong. (2003).

308 James N. Czaban, Hatch-Waxman Reform, 2001- Summary, Analysis, and Forecast, <http://www.hewm.com/use/articles/hatch.pdf> (last visited May 16, 2005) [hereinafter Hatch-Waxman Reform].

309 Id.

310 Id. See also Hasneen Karbalai, The Hatch-Waxman (Im)Balancing Act, 17-19 (2003), <http://leda.law.harvard.edu/leda/data/551/Paper1.html> (last visited Nov. 1, 2005).

311 Czaban, supra note 308, at 2.

312 Id.

313 Id.

314 Karbalai, supra note 310, at 17-22.

315 Id. at 2, 28.

316 Patent System, *supra* note 17, at 28.

317 See European Patent Convention, Art. 52(1) (European patent law grants patents only for those inventions “susceptible of industrial application.”).

318 Patent System, *supra* note 17, at 115.

319 Rebecca S. Eisenberg, Patents and the Progress of Science: Exclusive Rights and Experimental Use, 56 U. Chi. L. Rev. 1017, 1054 (1989).

320 Id. at 1054-55.

321 Id. at 1056-57. Eisenberg correctly points out that the transaction costs associated with obtaining a license for every patented invention constitute a “significant burden for researchers.” Id. at 1057.

322 Id. at 1074.

323 Maureen A. O’Rourke, Toward a Doctrine of Fair Use in Patent Law, 100 Colum. L. Rev. 1177 (2000).

324 Id. at 1177.

325 See 17 U.S.C. § 107(1)-(4) (1994 & Supp. III 1997) (outlining the statutory factors for fair use in copyright).

326 O’Rourke, *supra* note 323, at 1206.

327 Id.

328 Id.

329 Id.

330 Id. at 1206-07.

331 Id. at 1207-08.

332 O’Rourke, *supra* note 323, at 1207-08.

333 In other words, a copyright is automatic upon fixing the work in a tangible medium of expression; a patent is granted only after

extensive review by the United States Patent and Trademark Office, with no guarantee that the patent will be granted. See Eisenberg, *supra* note 319, at 1024-26; O'Rourke, *supra* note 323, at 1186.

334 Katherine J. Strandburg, What Does the Public Get? Experimental Use and the Patent Bargain, 2004 Wis. L. Rev. 81 (2004).

335 *Id.* at 100, 122.

336 *Id.* at 135-39.

337 *Id.* at 146.

338 *Id.* at 139.

339 Rochelle Dreyfuss, Protecting the Public Domain of Science: Has the Time for an Experimental Use Defense Arrived?, 46 Ariz. L. Rev. 457 (2004).

340 *Id.* at 457, 460-62.

341 Patent System, *supra* note 17, at 113.

342 Warburg et al., *supra* note 8, at 264-65; Campbell & Lupo, *supra* note 217, at 34.

343 Warburg et al., *supra* note 8, at 264-67.

344 *Id.* at 264-72 (discussing incentives for a company to protect intellectual property not only in its own field, but also in its competitors' fields).

345 *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 867 (Fed. Cir. 2003), vacated, 125 S. Ct. 2372 (2005).

346 *Merck KGaA v. Integra Lifesciences I, Ltd.*, 125 S. Ct. 2372, 2382 n.7 (2005).

347 See *supra* Part III.A.1.

348 Sarah E. Eurek, Comment, Hatch-Waxman Reform and Accelerated Market Entry of Generic Drugs: Is faster Necessarily Better?, 2003 Duke L. & Tech. Rev. 18 (Aug. 13, 2003), available at <http://www.law.duke.edu/journals/dltr/articles/2003dltr0018.html>.

349 See, e.g., Michael E. Burczynski et al., Clinical Pharmacogenomics and Transcriptional Profiling in Early Phase Oncology Clinical Trials, 5 *Current Molecular Med.* 83 (2005); Raymond Wadlow & Syidhar Ramaswamy, DNA Microarrays in Clinical Cancer Research, 5 *Current Molecular Med.* 111 (2005).

350 Generic drugs can only be commercially sold after the relevant patents expire. Thus, bringing a pioneer drug to market sooner does not correspondingly bring the generic version to market sooner as well.

351 Patent System, supra note 17, at 71-72.

352 Id. at 71-72.

353 NIH Report, supra note 9, at Competing Interests at Stake. In part the NIH found that “[t]hose who develop new tools tend to overvalue them, without taking into account all the other tools necessary to study a particular biological problem.... [T]he relative value of research tools is often difficult to predict and even more difficult to agree upon.” Id. at Scientists as Exporters of Research Tools.

354 NIH Report, supra note 9, at Summary of Problems.

355 Id.

356 Id.

357 Patent System, supra note 17, at 27, 71.

358 Id. at 70.

360 NIH Report, supra note 9, at Summary of Problems.

361 Patent System, supra note 17, at 71.

362 Id.

363 Id.