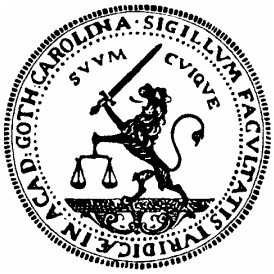

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Protecting inventions and promoting innovation – a difficult act of balance

A study of the experimental use exception and the "research tool issue"

Abstract: The experimental use exception has the purpose of stimulating the scientific and technological progress. This thesis studies the different scope and interpretation of the exception in Europe respectively in the US, as well as the regulatory approval (Bolar) exception. The thesis also presents the concerns regarding research tool patents, which have arisen due to such inventions' potential blocking effects on R&D. It is discussed how the research exceptions relate to research tools and whether research uses of such tools are or should be exempted from patent infringement. Alternative solutions to facilitate access to important research tools are also presented.

Master thesis
30 points

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Contents

Summary

The increased patenting activity worldwide, especially in the biotechnology field, has lead to an increased fear of blocking effects for the technological progress and follow-on research. Many inventions have an important application as research tools, meaning that they are used in facilitating research. Genetic sequences are for instance crucial in drug discoveries. Difficulties in gaining access to important research tools, due to for instance high license fees and patent thickets, may delay or thwart scientific and technological development. In this respect, the experimental use exception, provided by most patent laws, has come into focus. In order to balance the exclusive rights provided by a patent, the exception provides a right for third persons to conduct research upon a patented invention in order to encourage follow-on innovation. The nature, scope and application of such research exceptions differ between the different members of the international community. Neither within the EU is the exception fully harmonised, even though most European countries exempt experimental uses relating to the subject-matter of the patented invention. Research in order to improve, invent around or develop knowledge of an invention is permitted, while experimenting with inventions, i.e. as research tools, is not exempted. Belgium clearly deviates from this approach, exempting all uses of patented inventions. The limited and inconsistent case law regarding the experimental use exception has mainly concerned clinical trials. The relatively newly introduced regulatory approval (Bolar) exception has harmonised the EC approach regarding clinical trials for generic products within the EU. There is however divergent implementation and opinions on whether the exception applies to new drugs and research tools necessary in conducting clinical trials. Compared to Europe, the US has a very narrow experimental use exception, only exempting uses with non-commercial purposes. The statutory Bolar exception has instead been held to cover a wide range of patented inventions and activities, and to research performed both in the early and late R&D stages. This broad scope has been considered as potentially depriving research tool patents of their value.

Exempting all uses of patented inventions under the experimental use exception has been proposed as a solution to the problem of obtaining access to research tools in basic research. However, this may cause concerns as regards the underlying purpose with the patent system, which is to provide incentives to invent and promote scientific and technological innovation. If research tool inventors are not able to recoup their R&D costs the incentive to invent new and improved tools would diminish. There is thus a need to balance the patent holders interest of protecting their inventions and the public interest of stimulating scientific and technological development. Alternative and conceivably more balanced solutions to broad experimental use or regulatory approval exceptions have been suggested, such as exempting academic research, compulsory licensing, reach-through royalties or introducing a fair experimentation exception.

Abbreviations

CAFC	US Court of Appeals for the Federal Circuit
CPC	European Community Patent Convention
EMEA	European Medicines Evaluation Agency
EPC	European Patent Convention
EPO	European Patent Office
EU	European Union
FDA	US Food and Drug Administration
IND	Investigational New Drug
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
SOU	Statens Offentliga Utredningar
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
UK	The United Kingdom
US	The United States of America
U.S.C.	United States Code
WTO	World Trade Organization

1 Introduction

1.1 Background

"Many feel that by allowing genetic information to be patented, researchers will no longer have free access to the information and materials necessary to perform biological research. This issue of access to research tools relates to the ability of a patent holder to exclude others from using the material. Further, if a single patent holder has a proprietary position on a large number of nucleic acids, they may be in a position to "hold hostage" future research and development efforts."[1]

The constantly growing biotechnology sector has given rise to an immense number of new and patented inventions. Many of these genetic inventions have an important applicability as research tools, particularly in the development of new medicines. However, not only genes are research tools; laboratory equipment, chemical compounds and reagents are other examples. Due to their key role for the technological progress, concern has been raised over their potential blocking effects for R&D.

In order to achieve the underlying purposes of the patent system – promoting innovation and ensuring technological development and scientific research – it is a generally accepted principle in patent laws worldwide that a patent holder cannot prevent third persons' experimental use of the patented invention. Most patent laws therefore provide experimental use exceptions to patent infringement liability. The scope and application of such exceptions are however different in different countries, causing uncertainties for researchers to what extent they may use a patented invention in their research without being liable of patent infringement or having to pay license fees. The lack of clarity and harmonisation as regards the research exception has caused concerns during the last years, both on national and international level. In the US, the recent case *Merck v. Integra* has triggered the debate on the proper scope of the research defence, especially with regard to uses of research tool patents.

Does the use of patented research tools fall under the research exceptions? Tool users, for instance pharmaceutical companies, would certainly say yes, arguing that patented research tools constitute unreasonable obstacles to the development of new drugs. Tool inventors would on the other hand argue that research tool must be protected by the patent law, so that they can prevent unauthorised uses and recoup their R&D costs. How to find a proper balance between these diverging interests is not an easy task.

[1] Clarke et al,, *Patent Pools: A Solution to the Problem of Access in Biotechnology Patents?*, 2000 p. 3.

1.2 Purpose

As the patent system serves to facilitate incentives to invent and encourage technological and scientific progress, the research exception has a central role in pursuing these goals. In this regard, patents granted for research tools provide incentives to develop new or improved tools – but how about the use of them in research? Is it beneficial, from an innovation perspective, to exempt the use of such patented inventions because they constitute key inventions for important R&D? It is often argued that this would deprive the research tool patents of their value, thereby inducing negative effects for innovation overall. The purpose of this thesis is to examine whether the current scope of the experimental use and Bolar exceptions in Europe and the US properly promotes and balances the aims of the patent system, particularly as regards patented research tools, and whether the use of them are or should be exempted from patent infringement liability under these exceptions.

The first part of the thesis will study the development, interpretation and the current scope of the experimental use exception and the regulatory approval exception in Europe, the US, and, to a lesser extent, Sweden. The second part will then study how these exceptions relate to research tools. Here, the problems imposed by patented research tools will be examined, and whether the research exceptions in Europe and the US cover uses of research tools. The thesis discusses whether experimental use of research tools should be exempted from patent infringement, or if there are other, more balanced, solutions to the access problems and the potential blocking effects on R&D imposed by patented research tools.

1.3 Method and material

As one of the purposes of the thesis is to compare and analyse the experimental use exception and the regulatory approval exception in Europe and the US, a comparative legal method will be employed. Legislation, case law and doctrine from Europe and the US will be studied. A traditional legal method is also applied when drawing conclusions through the study of relevant legal material and case law. Since economic aspects are inherent in the patent system, where there is a balancing act between the incentives to innovate based on the economic benefits for the patent holder and the aim of optimising public welfare, a law and economics method is implicated as well, both when discussing the research exceptions and the “research tool issue”.

The material is from various sources. Relevant provisions in TRIPS and in European and US patent laws, as well as case law from European and US courts and the WTO Dispute Settlement Body, constitute the legal sources. patent legislation will constitute the legal framework. Relevant doctrine is predominantly articles from legal journals. The research tool debate has

mainly taken place in the US and most articles and other sources of commentary are therefore written by American commentators and scholars. However, several European commentators have also addressed the issue, especially during the last years. Several reports and studies published by governmental institutions and other organisations have also been important sources of information. A Swedish governmental report on biotechnical patents published in March 2008[2] has been the main source regarding the Swedish legal approach.

1.4 Delimitations

The thesis is directed to readers having knowledge in patent law and the rationale and policies underlying the patent system. Patent basics, such as the patentability criteria and patent rights enforcement, will therefore not be covered. Neither will every legislative provision and case law ruling be explained and discussed in detail.

Geographically, the scope of the thesis is limited to study the overall legal approach taken in Europe and in the US to the experimental use and regulatory approval exceptions, and research tool patents.

In section 4.1.2, regarding the case law in Europe on the experimental use exception, the study is limited to rulings from the appellate courts in the UK, Germany, France and the Netherlands, because these are the relevant and most commented in doctrine. The Swedish position is shortly studied for a broader comparative perspective.

Several alternative and interesting solutions to the access problem of patented research tools have been proposed. In section 7.3.2, three of the most commonly discussed proposals are highlighted. This survey is not intended to be exhaustive and in order to limit the length of this thesis, the solutions presented will not be evaluated in a greater extent.

The experimental use exception doctrine and the research tool debate are in certain ways closely related to the intersection between intellectual property rights and competition law. The subject of this thesis is however written from an intellectual property perspective and competition aspects will not be considered specifically.

1.5 Disposition

The second chapter of this thesis provides a short introduction to the underlying ideas and principles to the patent system and its experimental use exception, including a short introduction to the regulatory approval

[2] SOU 2008:20.

exception. Chapter 3 regards the TRIPS Agreement and Article 30 therein. The experimental use and regulatory approval exemptions available in Europe, respectively in the US will be examined in chapters 4 and 5. In these chapters the background, scope and interpretation of the exceptions will be studied. Chapter 6 covers the definition of research tools and the problems imposed by research tools, followed by chapter 7, which examines how European respectively US case law and doctrine have approached the "research tool issue" and the current state of their exceptions towards uses of research tools. The two last chapters, chapter 8 and 9, provide an analysis and a short conclusion.

2 Patents and innovation

2.1 Balancing the patent system

Most countries worldwide provide a patent law system with the common purpose of stimulating innovation and the development of new technology. Patent laws are believed to provide incentives to invent by granting inventors exclusive rights to exploit their inventions, thereby being able to prevent third persons from using, making, selling and importing the patented invention without authorization from the patent owner.[3] Before an inventor undertakes costly and time-consuming R&D he wants to be assured that he can reap economic benefits from a final invention. An incentive to invent is thus provided when an inventor has the possibility to recoup the costs and efforts laid down in R&D by enforcing his exclusive patent rights.[4] In exchange for the patent monopoly the patent holder must disclose the technical information of his invention. This "quid pro quo", where an inventor obtains exclusive rights in exchange for information regarding the invention to the public, is aimed at encouraging follow-on innovation.

Article 7 of the TRIPS Agreement states that: "*The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.*"[5] Accordingly, the protection of intellectual property rights should be weighed against the public interest of encouraging scientific and technological progress.[6] The society is generally benefited from inventions in two ways: through a direct utility to the users when the invention is embodied and through the use of an inventive idea for follow-on research and development that may lead to new or improved product and processes.[7] However, patent holders may, in order to maximise their own profit, not give other access to or knowledge about the new innovative technology. Neither could they have the incentive to invent around the invention or to develop follow-on new products or processes.[8] If third persons are not able to conduct research on patented technology, the progress of science may be hamper and delayed. If so, the patent system would counteract its own purpose of stimulating further innovation and benefit the society as a whole. Accordingly, there is a need

[3] Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004, p. 90.
[4] Ibid, pp. 104-105.
[5] Article 7 of the TRIPS Agreement.
[6] Correa, *The International Dimension of the Research Exception*, 2005, p. 5.
[7] Strandburg, 2004, p. 91.
[8] Iles, *A Comparative Analysis of the Impact of Experimental Use Exemptions in Patent Law on Incentives to Innovate*, 2005, p. 63.

to strike a proper balance between public and private interests.[9] In this act of balance, experimental use exceptions play a major role.[10]

2.2 Experimental use exceptions

Even though the patent system aims at promoting R&D by providing incentives to invent and disclose, exclusive patent rights may also hamper technological progress if the best potential follow-on inventors are prevented from building upon the patented invention during the patent term. Since technological and scientific progress is fostered through experimental activities, most patent laws worldwide provide an experimental use exception (also called "research exception" or "research defence") in response to the potential negative effects that patents may have on subsequent research.[11] Such exceptions permit third parties to use and make a patented invention for experimental purposes without the consent of the patent owner and without risking patent infringement liability. Without experimental use exceptions, researchers would be prevented or reluctant to improve inventions within the same field of technology, or to apply or adapt the patented invention within a different field of technology. This is due to possible difficulties in obtaining licenses or authorisation from the patent owner, high licensing costs or the risk of facing patent infringement actions. Experimental use exceptions are also held to facilitate a wider expansion of knowledge and development of inventions around the patent.[12]

Benyamini has outlined three main reasons for the exception:

1. Since the object of the patent system is to encourage innovation and to make technology available and known for the benefit of the society, it is not in the public interest to grant protection to a patent owner which may constitute an obstacle to research and further improvements of existing inventions.
2. Experimental use should not be considered as an infringement because this is not a use of the invention for the purpose for which the patent was granted.
3. The fundamental and widely acknowledged condition for applying the experimental use exception is that there is no commercial use of the invention involved in the experiment, and thus it is the patent owners' exclusive right to commercialise the invention.[13]

[9] Draft Report to the European Commission, *Monitoring and Analysis of Technology Transfer and Intellectual Property Regimes and their Use – Experimental Use Exemption*, 2007, p. 9.
[10] Strandburg, 2004, p. 93.
[11] Dent et al., *Research Use of Patented Knowledge: A Review*, OECD Working Paper, 2006, pp. 10-14.
[12] Ibid, p. 13, Draft Report to the Commission, p. 9
[13] Benyamini, *Patent Infringement in the European Community*, 1993, pp. 266-267.

2.2.1 Self-disclosing versus non-self-disclosing inventions

For a researcher to be able to benefit from the experimental use exception in order to develop or invent upon a patented invention, he needs to have access to the patented product or process. This is generally not a problem when a patented invention is available in an anonymous market where the patentee cannot distinguish between ordinary consumers of the invention or those wanting to conduct research using the invention.[14] However, not all patented inventions are commercialised and sold on anonymous markets. In this regard, it could be valuable to distinguish between self-disclosing inventions and non-self-disclosing inventions. *Self-disclosing inventions* are inventions which are easily reversed-engineered. This means that the inventions, often pharmaceuticals and product patents, are easily understood and competitors would be able to immediately produce and market a competitive product as soon as the inventor has put the product on the market. As regards self-disclosing inventions, these are generally patented in order for the inventor to prevent others from free-riding on the invention and thus rip the benefit of the invention. The patent system's incentive to invent thus applies to self-disclosing inventions.[15] In the case of *non-self-disclosing inventions*, the inventor has the possibility of protecting the invention as a trade secret because the invention, often process patents, is not easily copied. Patenting non-self-disclosing inventions would make the invention known and the inventor would therefore only patent the invention if the economic benefits of patenting exceeds the benefits of keeping it secret. The role of the patent system for non-self-disclosing inventions is therefore to give inventors an incentive to disclose the invention, thereby enabling accelerated subsequent research. If the best and most effective follow-on researchers are not getting access to the invention, the technological progress may be hampered or delayed.[16] When formulating an experimental use exception it is essential to balance certain factors. A too narrow exception may hamper the scientific progress while a too broad exception may compel inventors to keep their inventions secret.[17]

2.2.2 Classifying experimental purposes

Experimenting involves exploration of the unknown, and verification, clarification and illustration of the unknown.[18] In the context of the experimental use exception, the purposes underlying the experimental acts could be categorised differently.

[14] Domeij, *Pharmaceutical Patents in Europe*, 2000, p. 303.
[15] Strandburg, 2004, p. 105.
[16] Ibid, p. 106.
[17] Iles, p. 64.
[18] Hellstadius, *Gene Technology and the Law*, 2002, p. 80.

"Experimenting on" and "experimenting with"

Many patent systems distinguishes between "experimenting on" and "experimenting with" a patented invention. *Experimenting on* an invention is aimed at gaining a better understanding of the invention, to verify that it works as claimed or to improve it.[19] In this situation, the research relates to the same technological field as the invention, and the invention is used for a different purpose than for which it was intended. The primary market for the patentee is therefore not encroached upon. Such experimentation involves a minimal loss of profit when the patent holder still has exclusivity in the main market. In contrast, *experimenting with* a patented invention is using it according to the purpose for which it was originally designed, and for which the patentee was granted monopoly rights.[20] The research does not lead to new knowledge in the field to which the invention pertains. In other words, the inventions is used to study something else than the invention itself. Such uses are in most patent laws not exempted from infringement since it is considered as depriving the patentee from the main market and the value of the patent.[21]

Commercial and non-commercial purposes

Another way of distinguishing between different experimental uses is to consider whether the research has been carried out with a non-commercial purpose or a commercial purpose. A *non-commercial* motivation of the experimenter means that the use of a patented invention is purely for scientific purposes. Experiments are then conducted solely for gaining knowledge on the invention and not for developing a product or process to be put on sale. Such research is generally considered as being pursued in academic or public settings. If experiments are conducted with a *commercial* purpose, the results from the experiments are intended to be applied in the industry. The research is performed by private market actors with the aim of developing a product or process that could be put on the market or licensed, and thus yield economic benefits.[22]

2.2.3 Research exceptions and the drug industry

It is in the public interest that research in the biomedical and pharmaceutical sectors is encouraged since development of new and more efficient medical products and processes for the diagnosis, prevention and treatment of diseases have a clear impact on human health. The experimental use exception plays a significant role in facilitating access to patented drugs so

[19] Strandburg, 2004, p. 88.
[20] Ducor, *Research Tool Patents and the Experimental Use Exemption - A Non-win Situation?*, 1999, p. 1027.
[21] Strandburg, 2004, p 88.
[22] Ducor, p. 1027.

that researchers are able to develop and use them for producing generic, new or improved drugs.

The R&D phases

The basis for innovation in pharmaceuticals constitutes of *basic research*, or *early stage research*. In this stage, the research primarily aims at increasing the scientific knowledge of human biology, disease mechanisms and processes, and to understand how drugs and compounds work. Through biotechnological research, compounds that may be used in further pharmaceutical research can be discovered.[23] When a potential compound has been found, a drug candidate is developed and optimised through theoretical studies and animal tests in the *pre-clinical trials* phase. If the pre-clinical trials indicates that the compound has a therapeutic and economic value, the drug development will enter into the *clinical trials* phase, where investigations in human subjects are performed in order to discover or verify the clinical and other effects of a product.[24] For performing clinical trials, the researcher must usually file an Investigational New Drug (IND) application to a national authority.[25] The clinical trials must show that the product is safe and efficient in order for the manufacturer to put the product on the market. Such *regulatory approval* for marketing is given by a national authority, for instance the European Medicines Evaluation Agency (EMEA) or the US Food and Drug Administration (FDA).[26]

Other terms commonly used in research is upstream research and downstream research. *Upstream research* is research performed in the earlier stages, where the focus is on basic discoveries in order to discover compounds that may be used in further research, such as for example the identification of candidate drugs. *Downstream research* means research in the latter stages where final products are developed.[27]

Competitors' reasons for experimenting

The development of new pharmaceutical products are preceded by a long and expensive series of R&D. Patent protection is therefore seen as necessary for the drug manufacturer to be able to recoup the costs and efforts. When a substance is patented, competitors generally want to perform two different kinds of research under the experimental use exception. The first reason for experimenting is to find new indications of the patented pharmaceutical substance, which generally has been patented only for one medical indication. By differentiating a patented invention, a

[23] WHO Report, *Public Health, Innovation and Intellectual Property Rights*, 2006 (hereinafter: WHO Report 2006), p. 35,
available at: http://www.who.int/intellectualproperty/en/
[24] Ibid, p. 192, Domeij, *Läkemedelspatent,* 1998, p. 13.
[25] Domeij, 1998, p. 16
[26] Ibid, p. 458.
[27] WHO Report 2006, pp. 38 and 192.

competitor may develop a new product having the same therapeutic effect, thereby being able to obtain a share of the market.[28] The second reason is to conduct clinical trials for market approval for a patented product for an indication already patented during the patent term of a pharmaceutical product.[29] If competitors to a patent holder are able to conduct clinical trials for a market approval before the expiration of the patent, they can put their drugs immediately on the market as soon as the patent term ends, without risking patent infringement. This is of great economic value for generic competitors.[30]

The concept of the Bolar exception

A specific type of an experimental use exception is the so-called *regulatory approval exception*, or *Bolar exception*. The term "Bolar" stems from the US case *Roche v. Bolar*[31] (see below at 5.1.2) and the exception allows a third party to undertake, without the consent of the patent holder, trials and studies during the patent term necessary for the purpose of obtaining marketing approval for a product.[32] Generic manufacturers may rely on the original manufacturer's approval and already performed clinical trials in order to demonstrate that the generic is bioequivalent with the original drug. A Bolar exception thus prevents delayed marketing of generic (and often cheaper) drugs after the patent expiration, which otherwise would have occurred due to the time needed for the necessary regulatory approval process. Such a delay would de facto extend the patentee's period of market exclusivity.[33] Both the US and the EU has a statutory Bolar exception[34], but the scope of the exception differs, mainly as regards whether not only generics but also clinical trials for inter alia new medical compounds are exempted.[35]

[28] Domeij, 2000, p. 293.
[29] Goddar, *The Experimental Use Exception: A European Perspective*, 2001, p. 10.
[30] Domeij, 2000, p. 293.
[31] *Roche Products Inc. v. Bolar Pharmaceutical Co. Inc.*, 733 F.2d 858 (Fed. Cir. 1984).
[32] Pfaff, *"Bolar" Exemptions – A Threat to the Research Tool Industry in the U.S. and the EU?*, 2007, p. 260.
[33] Correa, p. 7, Pfaff, p. 260.
[34] In §271(e)(1) of the US Patent Act and enacted in the EU Member States through Directive 2004/27/EC.
[35] Roox, *The Bolar Provision: A Safe Harbour in Europe for Biosimilars*, 2006, p. 19.

3 The TRIPS Agreement and the experimental use exception

The TRIPS Agreement came into force in 1995 and constitutes the most comprehensive international agreement in the field of intellectual property rights.[36] The TRIPS Agreement requires the Member States of the WTO to enact certain minimum standards of intellectual property protection. Member States are free to adopt a more extensive protection, as long as such protection does not contravene the provisions of the Agreement.[37] Article 28 of the TRIPS Agreement provides that a holder of a patent is granted the exclusive right to prevent third parties to make, use, offer for sale, sell or import the patented product, as well as to prevent the use of a patented process. According to Article 7, the TRIPS Agreement shall reconcile the interests of innovators with those of the users of the patented technology, and the society as a whole, in order to promote technological innovation, diffusion and improvement.[38]

3.1 Article 30

To achieve a balance between intellectual property protection and the public welfare interest, Article 30 of the TRIPS Agreement provides for certain exceptions to the exclusive patent rights. Member States may have exceptions in their national patent laws if three cumulative conditions are fulfilled:

1. The exception must be limited,
2. The exception must not unreasonably conflict with normal exploitation of the patent, and
3. The exception must not unreasonable prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties.

Article 30 makes clear that a patent owner does not enjoy absolute exclusive rights, as they can be limited.[39] The three-step test in Article 30 was interpreted by the WTO Dispute Settlement Body in the dispute *Canada v. EU* in 2000, which concerned Canada's Bolar exception.[40]

[36] The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), signed April 15, 1994.
[37] Article 1(1) of the TRIPS Agreement.
[38] Correa, p. 5.
[39] Ibid, p. 6.
[40] *Canada – Patent protection of Pharmaceutical Products*, Report by the WTO Dispute Settlement Panel, 17 March 2000, WT/DS114/R.

3.2 Interpretation of the three-step test in Article 30

3.2.1 Canada v. EU

In the dispute *Canada v. EU*[41], the EU claimed that Canada's Patent Act was not in conformity with Canada's obligations under the TRIPS Agreement. The dispute regarded two exceptions from patent infringement liability; a regulatory review exception (section 55.2(1) of the Patent Act) and a stockpiling exception (section 55.2(2)). The stockpiling exception allowed competitors to produce and storage pharmaceutical products during the patent period in order to sell these goods on the date of the patent term's expiration. This exception was found by the Settlement Body to be incompatible with TRIPS. The regulatory review exception permitted third parties, prior to the patent expiration, to carry out experiments and tests required for a marketing approval of a generic drug, without the consent of the patentee. The Panel found this exception compatible with the criteria set out in Article 30, and Canada had thus not violated the TRIPS Agreement.

In reaching this conclusion, the Panel evaluated the exceptions' compliance with each of the three conditions set out in Article 30, in the light of Articles 7 and 8(1).[42] Regarding the first condition, the term "limited exception" was held to mean an exception "which makes only a small diminution of the rights in question". The narrow concept of "limited" was to be measured by the extent to which the exclusive rights of the patent owner had been curtailed.[43] The stockpiling exception was considered to be a substantial curtailment of the patent rights, since it encroached too much on the exclusive right to use and manufacture the invention. The regulatory review exception was however "limited" since the use was needed to comply with the requirements of the regulatory approval process. Also, no commercial use was made of the resulting final products.[44] In interpreting the second limitation of Article 30, the Panel discussed whether a de facto extension of the market exclusivity could be considered as a normal exploitation of the patent.[45] The Panel held the term "exploitation" to refer to commercial activity by which a patent owner employ his exclusive patent rights in order to extract economic value from it.[46] The regulatory review exception was found not to conflict with a normal exploitation of patents, because a period of a post-patent expiry market exclusivity was an unintended consequence of the regulatory process interacting with patent rights and not a normal consequence of enforcing patent rights.[47] The term "legitimate interests" in the last condition was interpreted as to protect interests that were justifiable

[41] Ibid.
[42] Ibid. at paragraph 7.26.
[43] Ibid. at paragraphs 7.30-7.31.
[44] Ibid. at paragraph 7.45.
[45] Ibid. at paragraph 7.52.
[46] Ibid. at paragraph 7.54.
[47] Ibid. at paragraph 7.57.

in the sense that they were supported by relevant public policies or other social norms.[48] The regulatory review exception was not found to prejudice the legitimate interests of patent owners.[49] Consequently, *Canada v. EU* established on an international level that an exception for uses reasonably related to the development and submission of any information required to obtain a regulatory approval was consistent with the TRIPS Agreement.

3.2.2 Applying the three-step test to the experimental use exception

The experimental use exception has not been challenged under TRIPS. Although referring to experimental use exceptions for scientific purposes as an example for interpreting what constitutes "legitimate interests", the Panel held that it did not draw the conclusion that any such national exceptions were automatically consistent with Article 30 of the TRIPS Agreement.[50] However, an experimental use exception is generally considered as being in compliance with the TRIPS Agreement.[51] With a research exception, a third person is able to perform research in order to obtain knowledge about the patented invention. As such research activities are relatively short in scope compared to the patent term, and are not aimed at exploiting its teaching, the exception can be considered as "limited". If experiments conducted *on* the invention are exempted, this is normally not considered as conflicting with the normal exploitation of the patent. The exclusive rights are not related to experimental activities as such and the patent owner may still enjoy the benefits provided from the market exclusivity and the patent's value is not significantly detracted. As regards the third condition, controlling the progress of research could not be considered as being a legitimate interest of the patent holder. In this regard, the interest of follow-on innovators, competitors and users, as well as the public interest of ensuring the advancement of science and technology, could be seen as a reasonable justification for the prejudice the patent owner may suffer.[52]

The situation may differ as regards exceptions for uses of research tools, as such experiments involves the use of an invention for which it was originally intended. Article 27 of the TRIPS Agreement mandates patents on research tools, but how the use of such research tools relate to TRIPS has not been much discussed, neither in case law and nor in doctrine. Article 31 of the TRIPS Agreement provides a possibility for states to authorise uses of patents through compulsory licensing in case of national emergency or in cases of public non-commercial use. The latter case may thus constitute a possible way to impose compulsory licensing for research tools used in non-profit research at universities, hospitals and other public settings.

[48] Ibid. at paragraph 7.69.
[49] Ibid. at paragraph 7.83.
[50] Ibid, at paragraph 7.69.
[51] Holzapfel & Sarnoff, *A Cross-Atlantic Dialog on Experimental Use and Research Tools*, 2007, p. 30, Draft Report to the Commission, p. 14, Correa, pp. 17-18.
[52] Correa, pp. 17-18.

4 The European exceptions

4.1 Experimental use exception

4.1.1 Legislation

There is no legislation on European Community level regarding patent protection, except for the Biotechnology Directive[53], which do not include any provisions regarding experimental use. Neither does the European Patent Convention (EPC), signed in 1973 and to which most European countries are parties, involve an experimental use exception. Article 64(1) of the EPC provides that the same rights conferred by a European patent in all contracting States to which the European patent extends shall be the same as the rights conferred by a national patent granted in that State. Article 64(3) states that any infringement of a European patent shall be dealt with by national law. Accordingly, the scope and limitations of patent rights are subject to national law and no provision regarding defences to infringement can be found in the EPC.[54]

In 1975 the European Community Patent Convention (CPC) was signed by the then Member States. Article 31 of this Convention (Article 27 in the revised and renumbered CPC from 1989) provides that:

> "*the rights conferred by a Community patent shall not extend to*
> *a) acts done privately and for non-commercial purposes;*
> *b) acts done for experimental purposes relating to the subject-matter of the patented invention*."

The CPC never came into force because of an insufficient number of ratifying states, but the convention has had an indirect harmonisation effect since the European countries generally have adopted provisions in their national patent law in conformity with the CPC. In addition, national courts have interpreted the national legislation in the light of the language, purpose and structure of the CPC provision.[55]

A harmonised experimental use exception is expected to be adopted through Article 9(b) of the Draft Council Regulation on the Community Patent.[56] This provision is identical to the experimental use exception in CPC, stating

[53] Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions.
[54] Holzapfel & Sarnoff, p. 24
[55] Ibid, p. 26, Dent et al, p. 18, Draft Report to the Commission, p. 14.
[56] Cook, *A European Perspective as to the Extent to which Experimental Use, and Certain Other, Defences to Patent Infringement, apply to Differing Types of Research*, 2006 (hereinafter: Cook, 2006), p. 68.

that a Community Patent shall not extend to "acts done for experimental purposes relating to the subject matter of the patented invention".[57]

As mentioned above, most European countries have in their patent laws inserted an experimental use exception in compliance with Article 27 of the CPC 1989.[58] This exception exempts research conducted *on* a patented invention, i.e. relating to the subject-matter of the patented invention, in order to improve or gain knowledge about it. Research performed *with* a patented invention is not considered as relating to the subject-matter of the patented invention since the experiments are aimed at studying something else.[59] Austria and Switzerland are among the few European countries lacking a statutory experimental use exception. Belgium also distinguishes itself from other European countries because of the recent adoption of an exception which applies to both "experimenting on" and "experimenting with" a patented invention (see further at 7.1.1).[60]

4.1.2 Interpretation of the exerimental use exception in European case law

The case law in Europe regarding the experimental use exception has developed in response to the specific conditions in the pharmaceutical industry and other industries, where safety and efficacy must be ensured before the marketing of a product is authorised.[61] The contested issue has been whether the exception extends to third persons' pre-clinical and clinical trials involving a patented invention during its patent term.[62]

Sweden

The Swedish Patent Act includes an experimental use exception in accordance with CPC's formulation and thus exempts uses related to the subject-matter of the patented invention.[63] In conformity with other European countries, experiments conducted on a patented invention are permitted, but not experiments with such inventions.[64] The scope of the

[57] Proposal for a Council Regulation on the Community Patent, Council Document 7119/04 of 8 March, 2004.
[58] A survey over the Member States' exceptions are outlined in the Draft Report to the Commission, pp. 15-16.
[59] Ducor, p. 1027.
[60] Article 28 of the Belgian Patent Act settles that "the exclusive rights deriving from a patent do not extend to acts on and/or with the patented invention for scientific purposes". Translation by Cook, 2006, p. 144.
[61] Cook, *Responding to the Concerns About the Scope of the Defence From Patent Infringement for Acts Done for Experimental Purposes Relating to the Subject Matter of the Invention*, 2006 (hereinafter: Cook, *Responding to the Concerns*), p. 194.
[62] Hellstadius, p. 82.
[63] Section 3(3) of the Swedish Patent Act (1967:837) states that "the following are excepted from the exclusive right […] use of the invention for experiments which relate to the invention itself".
[64] SOU 2008:20, p. 391.

exception has only been considered in a district court case from 1995.[65] In this case, the Stockholm Court of First Instance held that an application to the national authority (Läkemedelsverket) for a marketing approval that included manufactured samples of the drug, constituted patent infringement. The filing of an application including only written information involving the original patent, was on the other hand considered as exempted.[66] It has traditionally been considered that the Swedish exception exempts filing of applications for market approval for drugs involving a patented invention.[67] However, a recent study performed by a Swedish Committee on a governmental remit illustrates an unclear picture on whether the exception also extends to clinical trials needed in order to gather the information necessary for a market authorisation.[68] After having studied the current formulation of the experimental use exception in relation to academic and applied research, as well as to clinical trials, the Committee has concluded that the exception as such is well balanced in its wording, but that the scope of it should be clarified on a European level.[69]

United Kingdom

The UK Patents Act[70] has an experimental use exception with the same formulation as Article 27(b) of CPC 1989 and its scope was interpreted in the case *Monsanto v. Stauffer*.[71] The case concerned an alleged infringement of Monsanto's patents that related to certain herbicidal compositions containing as their active ingredient a substance called glyphosate. The defendant, Stauffer, had included glyphosate in a similar herbicide, which became subject for an injunction prohibiting Stauffer from further use or sale of their allegedly infringing product. Stauffer sought to rely on the experimental use exception for being able to conduct certain field trials with the aim of obtaining a market approval.[72] The UK Court of Appeal denied the application for conducting trials on fields that did not belong to Stauffer. The Court defined "experiments" as being acts conducted "in order to discover something unknown or to test a hypothesis or even in order to find out whether something which is known to work in specific conditions […] will work in different conditions".[73] Acts carried out in order to gather information or to demonstrate that an invention worked as claimed to satisfy a third person (for instance a medical approval agency) were not to be regarded as acts done for "experimental purposes". Accordingly, the exception was held to cover research performed in order to gain knowledge of or improve a patented invention, as long as the results were not aimed for a third person, i.e. clinical trials were not exempted.[74]

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[65] Stockholm City Court, T 7-536-93, 1995-06-05.
[66] Domeij, 2000, p. 293.
[67] Goddar, p. 13
[68] SOU 2008:20, p. 377.
[69] Ibid, p. 400.
[70] § 60(5)(b) UK Patents Act 1977.
[71] *Monsanto Co. v. Stauffer Chemicals Co.*, [1985] RPC 515 (U.K. Court of Appeal).
[72] Ibid, at 518-519.
[73] Ibid, at 542.
[74] Ibid.

In *Smith Kline & French Laboratories v. Evans* the UK Court of Appeal held that the experimental use exception covered acts for experimental purposes including experiments with a commercial end in view, but that the "purposes must relate to the claimed subject-matter of the patent in suit in the sense of having a real and direct connection with that subject-matter." [75]

Germany

Germany's experimental use exception[76] is identical to Article 27(b) of CPC 1989, but compared to UK's interpretation, the German Supreme Court has in the cases *Klinische Versuche I* and *II* established a broader scope of the exception.

Klinische Versuche I[77] from 1995 regarded the issue on whether the experimental use exception included clinical trials. In this case, the defendants had discovered a second medical indication for the patented protein interferon-gamma, and conducted clinical trials with the protein in order to get a regulatory approval for their new drug.[78] The Supreme Court found that the clinical trials fell within the experimental use exception and, in referring to *Monsanto*, interpreted the word "experiment" as including *all* acts for gaining information irrespective of the intended use of the information, provided that the experiments related to the subject-matter of the invention. The Court further stated that "the subject-matter of the invention is the claimed technical teaching, which also includes the use of the inventive substance." Accordingly, not only experimenting on the interferon-gamma but also experiments using the substance in clinical trials were exempted. The Court, in grounding its decision on the legislative aim of obtaining a balance between public and private interests, stated that the experimental use provision contained neither qualitative nor quantitative limits on the experimental acts. Therefore, it did not matter if the experiments were carried out to verify the patent's claim or to obtain further information of the invention. It also did not matter whether the use had a commercial purpose.[79] The Court concluded by stating that the exception only applied to experiments relating to the protected invention and not to experiments where the invention was used in order to gain information on other substances.[80]

The decision in *Klinische Versuche I* was confirmed in *Klinische Versuche II*[81], which concerned clinical trials performed to demonstrate bio-equivalence between the patented drug and a generic drug. The defendant had produced a polypeptide sequence, which was patented, but through a

[75] *Smith Kline & French Laboratories Ltd. v. Evans Medical Ltd*, [1989] FSR 513 (U.K. Patents Court).
[76] Section 11 No. 2 of the German Patent Act.
[77] *Klinishe Versuche I*, [1997] RPC 623 (BGH (Ger)).
[78] Ibid, at 629.
[79] Ibid., at. 639.
[80] Ibid., at 641.
[81] *Klinishe Versuche II*, [1998] RPC 423 (BGH (Ger)).

different method. The defendant aimed at performing clinical trials for obtaining a regulatory approval for this generic drug. Even though the trials did not aim at gathering new data or finding a new medical indication for the patented drug, the Court held that such trials fell under the experimental use exception, as long as the experiments were necessary for obtaining a regulatory approval. This ruling was confirmed in 2000 by the German Constitutional Court.[82] The German exception, applicable whenever the aim is to gain new knowledge about the subject-matter but irrespective of for what purpose the information is used, is considered as being one of the most liberal in Europe.[83]

France

The French experimental use exception covers use of a patented invention necessary to perform experimental work relating to the subject matter of the invention.[84] It was interpreted by the French Court of Appeal in *Wellcome Foundation v. Parexel International & Flamel*[85]. In this case, the defendant Flamel conducted clinical trials in order to demonstrate that their patented technology could be applied on Wellcome's patented molecule. Wellcome claimed that Flamel was guilty of patent infringement since the clinical trials did not have an experimental nature. The Court held that clinical trials aimed at finding a new way of using a patented invention were covered by the experimental use exception. Flamel's purpose was to compare different methods and to discover the best mode of delivery and daily dosage of the patented molecule. As long as the trials had an experimental nature, it did not matter that the trials ultimately had a commercial benefit.[86]

The Netherlands

The Dutch courts have in a number of cases interpreted the Dutch experimental use exception, which relates solely to research on the patented subject-matter.[87] In *Pharbita and Medicopharma v. ICI*[88] the Dutch Supreme Court stated that experiments undertaken with a commercial end in view, to establish whether the invention can be worked or to further develop the invention, were permitted prior to the expiration of the patent.[89] The case *Kirin Amgen v. Boehringer Mannheim*[90] established that the research defence was applicable for trials conducted on a therapeutic protein in order to find new indications of that protein, while large scale trials with the

[82] Cook, 2006, pp. 30-31, Holzapfel & Sarnoff, p. 28.
[83] Goddar, p. 23, Hellstadius, p. 82.
[84] Article L.613-5 of the French Intellectual Property Code.
[85] *Wellcome Foundation v Parexel International & Flamel & Créapharm*, Tribunal de Grande Instance de Paris, 20 February 2001 (PIBD 2001, 729, III-530).
[86] Cook, 2006, p. 39, Draft Report for the Commission, pp. 19-20.
[87] Article 53(3) of the Netherlands Patent Act 1995, Draft Report for the Commission, p. 15.
[88] *Pharbita and Medicopharma v. Imperial Chemical Industries PLC*, (1992, Dutch Hoge Raad).
[89] Derzko, *A Local and Comparative Analysis of the Experimental Use Exemption – Is Harmonization Appropriate?*,2003, p. 30.
[90] *Kirin Amgen v. Boehringer Mannheim*, (1995, Dutch Hoge Raad).

purpose of obtaining product registration was not considered to be covered by the exception in *Applied Research Systems v Organon*[91]. In *SmithKline French Laboratories v. Generics*[92] a submission of a patented drug in an application for regulatory approval was found to infringe the patent.[93] According to this case law, the Dutch approach is similar to the one in the UK.[94]

4.2 The European Bolar exception

4.2.1 Directive 2004/27/EC

The European courts have provided divergent interpretations on the scope of the experimental use exception and its application to clinical trials. In order to cope with the uncertainties created and to harmonise the law in this area, a Bolar-type exception was introduced through Directive 2004/27/EC[95]. Article 10(6) of this Directive, which amends Directive 2001/83/EC regulating the manufacture, marketing and distribution of medicinal products for human use, states that:

> "*conducting the necessary studies and trials with view to the application of paragraphs 1, 2, 3, and 4 [of Article 10 of the Directive] and the consequential practical requirements shall not be regarded as contrary to patent rights or to supplementary protection certificates for medicinal products*".

Paragraphs 1, 2, 3 and 4 of Article 10 regards abridged procedures where generic manufacturers can obtain a regulatory approval for a product or a process similar to a patented invention, without having to conduct any or only some pre-clinical or clinical trials. By enacting a regulatory approval exception, the purpose was to facilitate early marketing of medicines and generic competition. The public would then benefit from an increased access to secure and cheaper pharmaceuticals, while the EU's competitiveness on the international drug market would be strengthened.[96]

After the WTO ruling given in Canada v. EU (see above at 3.2.1) the Commission became more benign towards introducing a European Bolar exception, particularly in relation to the introduction of a new Community patent regulation.[97] The Bolar exception was enacted as a part of the "New Medicines Legislation", but has in fact worked as a way to harmonise the

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[91] *Applied Research Sys. ARS Holding NV v Organon Intl. BV*, (1995, Dutch Hoge Raad).
[92] *SmithKline French Laboratories Ltd. v. Generics VB*, (1997, Dutch Hoge Raad).
[93] Derzko, p. 31, Holzapfel & Sarnoff, p. 28.
[94] Draft Report to the Commission, p. 21, Hellstadius, p. 82.
[95] Directive 2004/27/EC of the European Parliament and of the Council of 31 March 2004 amending Directive 2001/83/EC on the Community Code relating to medicinal products for human use. Implementation by October 30, 2005.
[96] Roox, p. 19.
[97] The Commission's answer to the written question E-2567/00 of 27 September 2000 stated that: "The Commission has recently agreed on a proposal for establishing a

patent legislation within the Community, since the Member States have introduced the exceptions in their respective patent laws. Article 9(b.1) of the latest proposal for a Community patent regulation cross-refers to the exception in the "New Medicines Legislation".[98]

4.2.2 Different implementation and interpretation

The European Bolar exception clarifies what kind of research manufacturers of generics and biosimilars are able to perform during the patent term without being liable for patent infringement, but the wording of Article 10(6) is vague and has been given different interpretations.[99] The uncertainties regarding the scope of Article 10(6) concern what kind of "trials and studies" that are exempted, and the meaning of the ambiguous term "consequential practical requirements".[100] It is clear that the exception covers both pre-clinical and clinical trials conducted for a marketing approval for generics and biosimilars. In addition, manufacturing of the active substance in the generic and submitting a sample of the product to the regulatory authority is exempted. It is however unclear whether pre-marketing activities and tests for developing a new drug are covered.[101]

Some countries, such as Sweden[102] and the UK[103], have adopted a narrower scope of the exception, implementing a provision with a similar wording as Article 10(6) to the list of non-infringing uses.[104] These exceptions are considered as only applying to generics.[105] Other countries, such as France, Italy and Germany, have implemented a broader exception that is not limited to generic products, but extends to all trials necessary for obtaining a regulatory approval.[106] Germany has a very broad exception[107] because it

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Community patent. The discussions in the Council and the Parliament on this proposal will certainly address the issue of the so-called Bolar type exception to patent rights. The Commission will take note of the positions taken on this issue in respect of the Community patent and will, if necessary, then consider whether any further initiatives should be taken in relation to the national patent systems in the Community."

[98] Article 9(b.1) settles that "acts carried out solely for the purpose of conducting tests and trials in accordance with Article 13 of Directive 2001/82/EC or Article 10 of Directive 2001/83/EC in respect of any patent covering the reference product within the meaning of either of the said Directives."

[99] Draft Report to the Commission, p. 11, Pfaff, p. 261.

[100] Roox, p. 19.

[101] Ibid.

[102] The new paragraph 4 in Section 3 of the Swedish Patent Act states that studies, trials, tests and practical requirements relating to a reference medicinal product necessary in order to obtain a marketing approval for a pharmaceutical, are exempted from patent infringement. The provision then refers to the provisions in the relevant EC Directives.

[103] Amendment of Article 60(5) of the 1977 UK Patents Act.

[104] Cook, 2006, p. 66.

[105] Ibid, p. 68, Draft Report to the Commission, p. 11.

[106] Cook, 2006, p. 67, Draft Report to the Commission, p. 11, Pfaff, p. 271.

[107] The new paragraph 2b to section 11 of the German Patent Act, exempts "studies and trials and the consequential practical requirements which are necessary to obtain an

covers trials with the purpose of finding and developing new substances. In addition, the German exception is not limited to clinical trials performed for a market approval in the EU, and thus applies to all activities performed in order to get a regulatory approval in separate Member States as well as outside of the EU.[108]

Commentators advocating a broad scope of the exception have interpreted the legislator's intention as to facilitate, not just marketing of generics, but clinical trials at large. This would increase the access to drugs and increase clinical trials conducted within the EU. Moreover, it has been argued that pre-clinical trials are necessary as a preparation to the following clinical trials and that the final purpose with all kinds of trials performed by pharmaceutical companies is to apply for a regulatory approval.[109] Others interpret the exception as to cover only generic products and bioequivalents and the trials performed in order to demonstrate their efficiency and safety, since this is directly necessary for a market approval.[110]

It has been feared that the uncertainties regarding the "Bolar" exception would lead to an outsourcing of clinical trials to countries outside of the EU, with broader or clearer rules.[111] Similarly, different interpretation and scope of the experimental use exception may cause difficulties within Europe, for instance when a research project involves researchers in different countries.[112]

4.3 Conclusion

Due to the lack of harmonized legislation and different patent policies, there is a range of flexibility regarding the scope of the experimental use exception in Europe. The European courts have made various interpretations of the exception as set out in Article 27(b) of CPC 1989 and the corresponding national provisions. The common denominator is however that most European countries have an experimental use exception for uses relating to the subject-matter of the patented invention, which cover experiments on the invention. An experimental purpose is to verify the patent, test a hypothesis or to gain information about the patented invention so that it can be improved or invented around. Moreover, a final commercial intent does not affect the assessment and there is generally no differentiation between basic and applied research or between academic and commercial researchers. Whether the experimental use exception extends to clinical trials or not constitutes the main difference among European countries. In

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authorisation according to the Medicines Act for the marketing in the European Union or […] in the Member States of the European Union or in third countries."

[108] Roox, p. 20.

[109] Augenstein, *The Admissibility of Clinical Trials With Respect to the Utilisation of Patented Research Tools*, 2007, p. 32.

[110] Cook, 2006, p. 68, Pfaff, p. 271.

[111] Cook, 2006, p. 77.

[112] SOU 2008:20, p. 370.

this regard, Germany can be considered as one of the most “user-friendly”, exempting all experiments aimed at acquiring knowledge on the subject-matter of the patented invention, no matter for what purpose the knowledge is intended. Thus it covers verification of an invention’s novelty and functioning, comparison with other products and discovering of new applications for the invention. Belgium has the broadest experimental use exception, exempting all uses of patented inventions for scientific purposes.

The implementation of the regulatory approval exception in Directive 2004/27/EC has been diverse throughout Europe, some countries holding it to only cover generics while others have extended the scope to cover new pharmaceutical substances.

5 The research defence in the US

§ 271(a) of the US Patent Act states that anyone who uses, makes, sells, offers to sell or imports any patented invention during the patent term without authorization from the patent owner is liable of patent infringement.[113] However, there are two exceptions to this statutory right to exclude others from using the patent holder's invention: the common law experimental use exception and the statutory regulatory approval exception.

5.1 The experimental use (common law) exception

5.1.1 Early development through case law

The US has no general statutory experimental use exemption and the experimental use doctrine has been established solely by case law. The US experimental use exception originally stems from an opinion written by Justice Story in the case *Whittemore v. Cutter* from 1813.[114] This case regarded an alleged infringement of a patent for a machine that produced playing cards. Justice Story reasoned that "it could never have been the intention of the legislature to punish a man who constructed such a machine merely for philosophical experiments, or for the purpose of ascertaining the sufficiency of the machine to produce its described effects." In a subsequent case, Justice Story formulated an experimental use defence for third persons' use of patented inventions for non-profit purposes. The use of a patented invention would not infringe the patent rights if it was for "the mere purpose of philosophical experiment, or to ascertain the verity and exactness of the specification".[115] In 1861, the experimental use exception was settled to protect use of patented inventions for amusement and verification of the mechanisms of the invention as long as the user did not have a commercial intent. [116]

[113] The US Patent Act, 35 U.S.C. § 271(a).
[114] *Whittemore v. Cutter*, 29 F. Cas. 1120 (C.C.D.Mass. 1813).
[115] *Sawin v. Guild*, 21 F. Cas. 554 (C.C.D. Mass. 1813).
[116] Dzerko, p. 5, and Cook, 2006, p. 7, quoting the case *Poppenhusen v. Falke*, 19 F. Cas. 1048, 1049 (C.C. S.D.N.Y. 1861) where it was held that "it was well settled that an experiment with a patented article for the sole purpose of gratifying a philosophical taste, or curiosity, or for mere amusement is not an infringement of the rights of the patentee."

5.1.2 Narrow interpretation of the common law exception

Based on the early case law, the current common law exception was established by the Federal Circuit (CAFC)[117] in 1984 in the case *Roche v. Bolar*[118]. This case, and following cases, have defined the experimental use exemption as being truly narrow and not applicable to uses "in keeping with the legitimate business" of the alleged infringer.[119]

Roche v. Bolar

In *Roche v. Bolar* the pharmaceutical company Roche had a patent on an active composition in a drug. Six months before the expiration of the patent Bolar, a company producing generic drugs, used the patented drug to conduct tests and collecting data that were needed for filing a market approval application to the FDA. Roche sued Bolar and wanted the court to enjoin Bolar from any unlicensed use of the active patented ingredient during the remaining patent term of Roche's drug.[120] In supporting Roche, the court found Bolar guilty of patent infringement and that the use of Roche's patent had been solely for business purposes. The experimental use exception was held to be "truly narrow" and could not be so broadly interpreted as to allow scientific inquiry with "definite, cognizable and not insubstantial commercial purposes".[121]

Embrex. v. Service Engineering

In *Embrex v. Service Engineering*[122] it was found that a failed experiment to design around a patent constituted patent infringement. Embrex owned a patent on a method for vaccinating birds against a disease by injecting a vaccine into a certain region of the egg before hatching. The defendant sought to design around the Embrex patent by developing an injection machine to find a way to inject the vaccine outside the region of the egg that was covered by the patent.[123] The research failed since it had been impossible to prevent injections into the claimed region. The majority of CAFC held that the defendant was liable for patent infringement because the use of the patent in the experiments and had been expressly for the commercial purpose of developing and selling a injection machine, and the use could therefore not be exempted under the experimental use exception.[124] Designing around an invention was thus not considered as infringing as long as it was for amusement or true scientific inquiry.

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[117] The US Court of Appeals for the Federal Circuit (CAFC) is an appeals court with a nationwide jurisdiction over for instance intellectual property cases.
[118] *Roche Products Inc. v. Bolar Pharmaceutical Co. Inc*., 733 F.2d 858 (Fed. Cir. 1984).
[119] Ibid, at 863.
[120] Ibid, at 860.
[121] Ibid. at 863.
[122] *Embrex Inc. v. Service Engineering Corporation*, 216 F.3d 1343 (Fed. Cir. 2000).
[123] Ibid. at 1346.
[124] Ibid. at 1349.

Madey v. Duke University

Madey v. Duke University[125] was the first case dealing with the applicability of the experimental use exception to university research activities. In this case, professor Madey owned two patents embodied in laboratory equipment, which had been used during his time as a laboratory director at Duke University. After Madey had resigned, Duke continued to use the equipment and Madey filed a patent infringement suit. Duke argued that the use had been for experimental purposes and thereby exempted under the experimental use exception. The CAFC, in referring to *Embrex* and *Roche v. Bolar*, held that the experimental use defence was very narrow and limited in scope and that no conduct that was "in keeping with the alleged infringer's legitimate business, regardless of commercial implications", was immunised from a claim of patent infringement. By this, the court meant that uses of a patented invention in the university's research activities were not exempted from patent infringement, and whether the use had a commercial purpose or not did not matter. The use of the patents in the university's basic research constituted an infringement since it furthered "the institution's legitimate business objectives, including educating and enlightening students and faculty participating in these projects. These projects also serve, for example, to increase the status of the institution and lure lucrative research grants, students and faculty." [126] Accordingly, what did matter was whether the act was in furtherance of the infringer's legitimate business and was not solely for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry. The profit or non-profit status of the user was not determinative, meaning that Duke University's non-profit and educational status did not protect it from claims of patent infringement.[127]

5.2 Regulatory approval (Bolar) exception

5.2.1 Legislation

After the ruling in *Roche v. Bolar* it was feared that an application of the ruling would lead to a de facto extension of a patent holder's term of protection.[128] This would harm the balance between the rights and interests of patentees and generic manufacturers, and constitute an obstacle for the scientific progress and incentives to innovate.[129] As a response, the US Congress enacted a statutory regulatory approval exception under 35 U.S.C.

[125] *John M.J. Madey v. Duke University*, 307 F.3d 1351 (Fed. Cir. 2002).
[126] Ibid, at 1362.
[127] Mueller, *Evanescent Experimental Use Exemption from united states patent infringement liability: implications for university and nonprofit research and development*, 2004, p. 943.
[128] Dzerko, pp. 7-8 and *Integra LifeSciences I, Ltd. v. Merck KGaA*, 331 F.3d 860 (Fed. Cir. 2003), at 865.
[129] Freschi, *Navigating the Research Exemption's Safe Harbor*, 2005, p. 864.

§ 271(e)(1) of the Drug Price Competition and Patent Term Restoration Act of 1984, also called the Hatch-Waxman Act. The provision states that:

> "*it shall not be an act of infringement to make, use, offer to sell within the United States or import to 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 or veterinary biological products*".[130]

This industry-specific safe harbour provision is also known as the Bolar exception and allows experimental testing of a generic drug before the expiry of the patent for purposes "reasonably related" to a regulatory approval. The exception has raised uncertainties regarding the scope of the patent, the meaning of a "patented invention" and what kinds of uses that would be considered as "reasonably related" to the FDA submission. These issues have been considered in several cases, through which the US courts have adopted a broad scope of the regulatory approval exception.[131]

5.2.2 Interpretation of the Bolar exception in US case law

Towards a broad scope

In the first cases regarding the regulatory approval exception, the courts applied a narrow interpretation of the exception.[132] A broad interpretation has however been given in the later cases. In *Eli Lilly v. Medtronic*[133] the Supreme Court was faced with determining whether the use of a medical devise was exempted under the regulatory approval exception. The Court held that the regulatory approval exception was not limited to drug-related inventions and applied it to uses of all products requiring a market approval from the FDA, such as medical devices, food and color additives, new and antibiotic drugs and human biological products .[134]

In the case *Intermedics v. Ventritex*[135] the district court held that the regulatory approval exception applied to a situation where the alleged infringer had an intent to commercialise a product prior to the expiration of the patent. The court developed a "reasonably related use" test to determine whether an activity was reasonably related to the regulatory approval process under § 271(e)(1). According to this test, it should be asked whether "it would have been reasonable, objectively, for a party in defendant's situation to believe that there was a decent prospect that the 'use' in question would contribute (relatively directly) to the generation of kinds of

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[130] Drug Price Competition and Patent Term Restoration Act of 1984 (1984 Act), 98 Stat. 1585.
[131] Patel, *Are Patented Research Tools Still Valuable?*, 2007, p. 412, Iles, p.69.
[132] *Scripps v. Genentech*, 666 F.Supp. 1379 (N. D. Cal 1987), and *Infigen v. Advanced Cell Technology, Inc*., 65 F.Supp. 2d 967 (W. D. Wisc 1989), referred in Cook, 2006, p. 54.
[133] *Eli Lilly & Co v. Medtronic, Inc.*, 496 U.S. 661, 110 S.Ct. 2683 (1990).
[134] Ibid. at 674.
[135] *Intermedics, Inc. v. Ventritex Co., Inc*., 775 F.Supp. 1269 (N.D.Cal. 1991) affirmed in 991 F.2d 808 (Fed. Cir. 1993).

information that was likely to be relevant in the processes by which the FDA would decide whether to approve the product." If an alleged infringer has been engaged in activities with purposes beyond generating data to the FDA, i.e. for business purposes, the exception would still apply.[136] In *Telectronics v. Ventritex*[137] the alleged infringer Ventritex had displayed its defibrillator, involving patents held by Telectronics, at several medical conferences. The CAFC found that the displaying of the defibrillator fell under the Bolar exception because this activity was aimed at finding investors who would be willing to perform the necessary regulatory approval trials. The court stated that even though the activities were conducted before the regulatory approval phase, these activities were preparatory and necessary in order to obtain an approval.[138] A broad scope of the Bolar exception was also given in *Nexell Therapeutics v. AmCell*[139], where AmCell had used antibodies patented by Nexell for the development of a magnetic cell-separating device. In applying the test established in *Intermedics*, the court found that promotion activities for the device involving the patented antibodies were reasonably related to an FDA application and thus exempted.[140]

The courts have exempted a broad range of activities objectively related to a FDA approval, but where the users have had no intention of using the generated data for a submission to the FDA.[141] For instance, in *Abtox Inc. v. Exitron Corporation*[142] the CAFC held that the underlying purpose or consequences of the research activity did not matter as long as the use was reasonably related to FDA approval.[143]

A case related to research tools was *Bristol-Myers Squibb v. Rhone-Poulenc Rorer*[144]. In this case Bristol-Myers used intermediates (substances formed during a chemical process before the desired product is obtained) patented by Rhone in order to develop a drug similar to the cancer drug Taxol. Bristol-Myers held that the regulatory approval exception applied to the experiments where the intermediates were used as research tools and the district court agreed. The court applied the "reasonably related test" established in *Intermedics* and stated that it had been reasonable objectively for Bristol-Myers to believe that the use of the intermediates would contribute to the generation of information relevant to FDA approval.[145]

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[136] Ibid, at 1280.
[137] *Telectronics Pacing Systems, Inc., v. Ventritex, Inc*., 982 F.2d 1520 (C.A. Fed 1992).
[138] Ibid, at 1523-1524.
[139] *Nexell Therapeutics, Inc. v. Amcell Corporation*, 199 F.Supp.2d 197 (D.De. 2002).
[140] Ibid, at 205.
[141] Iles, p. 72, Dzerko, p. 18.
[142] *Abtox Inc. v. Exitron Corperation*, 122 F.3d 1019 (Fed. Cir. 1997), at 1029.
[143] Ibid. at 1030.
[144] *Bristol-Myers Squibb Co. v. Rhine-Poulenc Rorer, Inc*., not reported in F.Supp. 2d, 2001 WL 1512597 (S.D.N.Y. Nov. 28, 2001).
[145] Ibid, at 94.

Merck v. Integra

The landmark case *Merck v. Integra*[146] concerned the issue on whether uses of patented inventions in preclinical research (giving rise to results that were not ultimately included in a FDA submission) were exempted from patent infringement.[147] Dr. Cheresh and Scripps had identified a RGD peptide that could be used to prevent angiogenesis (production of blood vessels) when it interacted with certain cellular surface receptors. This method of inhibiting angiogenesis was considered as a treatment of several diseases, including cancer. Dr. Cheresh and Scripps entered into a collaborative agreement with Merck to develop a new drug based on these findings and to get a permission to conduct clinical trials through an IND application.[148] The research was not aimed at determining the safety of drug candidates but rather to determine which peptide that was the best potential drug candidate. Integra claimed that the defendants' early stage research had infringed Integra's patents related to RGD peptides, which was also the finding of the district court and the CAFC.[149]

The Supreme Court unanimously reversed the CAFC's ruling and clarified that the Bolar exception exempted all uses of patented compounds reasonably related to the regulatory approval process. The exception would therefore apply as long as a researcher had "a reasonable basis for believing that a patented compound may work, trough a particular biological process, to produce a particular physiological effect, and uses the compound in research that, if successful, would be appropriate to include in a submission to the FDA." As long as the activities were necessary in order to develop a drug, it did not matter in what stage of research the tests were undertaken, since both early and late stage research constituted "a process of trial and error". Basic and pre-clinical research could thus be exempted when constituting a prerequisite for the FDA approval process.[150] On remand, the majority of the CAFC, in interpreting the Supreme Court's opinion, held that the regulatory approval exception is not applicable to "basic scientific research unrelated to development of a particular drug".[151] However, since all of Merck's experiments had been performed after the discovery of the anti-angiogenesis property of the RGD peptide, they were not considered as basic scientific research. All experiments had been reasonably related to the information submitted in a regulatory approval application.[152]

In CAFC's first ruling the court discussed whether the RGD peptides had been used as research tools. The Supreme Court and the CAFC on remand however expressly declined to regard the issue since neither party had

[146] The *Merck v. Integra* litigation was decided by the CAFC in 2003, *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860 (Fed. Cir. 2003). It was appealed to the Supreme Court in 2005 and on remand the CAFC delivered the final decision in 2007.
[147] *Merck KGaA v. Integra Lifesciences I, Ltd*., 545 U.S. 193 (2005), at 195.
[148] Ibid, at 197-198.
[149] Ibid, at 201.
[150] Ibid, at 205-207.
[151] *Integra Lifesciences I, Ltd v. Merck KGaA*, 496 F.3d 1334 (Fed. Cir. 2007), at 1339.
[152] Ibid, at 1348.

argued that the RGD peptides had been used as research tools. Dissenting Judge Rader in CAFC's second ruling agued that the majority's ruling unduly extended the Supreme Court's interpretation of § 271(e)(1) and held it to effectively diminish the value of research tools (see further in 7.2.2).[153]

Post Merck v. Integra

Later cases have shown that that the broad interpretation of the regulatory approval exception is not without limits. In *Third Wave v. Stratagene*[154] the district court ruled that a "remote desire to obtain FDA approval for products" is not enough to satisfy the reasonably related test. Here, the court focused on the word "solely" and held that tests with a partial desire to obtain FDA approval was insufficient for the exception to apply.[155] In the recent case *Amgen v. ITC*[156], the CAFC stated that not *all* activities performed were exempted from infringement during the period before a regulatory approval. The alleged infringer, Roche, conducted studies for marketing purposes on its product involving Amgen's patents. This was done *after* having submitted a complete FDA application, but before an authorisation was granted. The court, in referring to *Merck v. Integra*, held that each study must be evaluated separately in order to determine whether it was intended for FDA approval.[157] Accordingly, not all uses of a patented invention during the regulatory approval process are automatically exempted from in infringement claims.

5.3 A potential outsourcing effect of basic research

The narrow scope of the experimental use exception, where a slight commercial intent renders it inapplicable, has caused fear that US companies would be forced to outsource their basic research to countries with broader research exceptions, where researchers would not face the risk of patent infringement liability.[158] Such relocations have been facilitated by US courts' interpretation of § 271(g) of the US Patent Act[159], where information from early stage research gained abroad could be imported to the US without infringing a process patent.[160] The regulatory approval

[153] Ibid, at 1347-1348.
[154] *Third Wave Technologies, Inc., v. Stratagene Corporation*, 381 F.Supp.2d 891 (D. Wis. 2005).
[155] Ibid, at 913.
[156] *Amgen, Inc., v. International Trade Commission (ITC)* (Fed. Cir. March 19, 2008).
[157] Ibid.
[158] Helm, *Outsourcing the Fire of Genious*, 2006, p. 155, Warburg & Maebius, *Warning – Research Dollars at Risk*, 2003, Mireles, *Adoption of the Bayh-Dole Act in Developed Countries: Added Pressure for a Broadened Research Exemption in the United States?*, 2007, p. 276.
[159] § 271(g) states: "whoever without authority imports into the United States [...] a product which is made by a process patented in the United States shall be liable as an infringer."
[160] *Bayer AG v. Housey Pharmaceuticals, Inc.*, 169 F.Supp.2d 328 (D. Del. 2001).

exception has also been established to apply to imported products developed abroad by US patented inventions.[161]

In the case *Amgen v ITC* the CAFC stated that §271(e)(1) also applies to proceedings under the Tariff Act[162]. In this case, a process patented by Amgen in the US had been used in producing products in Europe by Roche. These products had thereafter been imported to the US in order to be used for developing information for a FDA submission. Amgen argued that their patent had been infringed and that the regulatory approval exception did not apply when a proceeding was brought under the Tariff Act. The CAFC stated however that §271(e)(1) applied to patent infringement liability both under the Tariff Act and § 271(g) of the Patent Act. The Court referred to the broad interpretation in *Merck v. Integra* and the Congress' purpose of removing patent-based barriers to regulatory approvals.[163] Hence, the regulatory approval exception was held to apply, in actions brought both under the Tariff Act and the Patent Act, to process patents used offshore to produce a product, which would be imported back to the US for the exempt purposes of §271(e)(1). Consequently, an outsourcing effect may be caused by the loopholes created through the interpretation of §271(g).[164]

5.4 Conclusion

The two experimental use doctrines in the US have developed separately since they have been applied in separate contexts. The common law exception protects only research for "amusement, to satisfy idle curiosity, or for strictly philosophical inquiry". The exception cannot be compared to the European experimental use exception since it only covers experimental uses with no commercial purpose. Basic research performed by biotechnology companies is therefore not covered, and neither is research performed by universities if there is a slight commercial aim. The statutory Bolar exception in § 271(e)(1) applies to research done for obtaining a market authorisation for a commercial product. It does not only cover generics, but any type of product or process for which FDA approval is required. The Bolar exception is thus broader in scope than the experimental use exception, with regard to uses to which they both may apply. The exception has also been held to cover a various range of activities, performed in both early and late stage research phases. Not all information gained has to be included in a submission. As long as the researcher has a reason to believe that the experiments are relevant for obtaining an approval to market a drug, the exception applies.

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[161] *Bio-Technology General Corp. v. Genentech Inc.*, 80 F.3d 1553 (Fed. Cir. 1996),
[162] Section 337 of the Tariff Act of 1930 assigns to the International Trade Commission (ITC) the authority and obligation to investigate and prohibit importation based on unfair competition derived from patent infringement, such as articles "[…] made, produced, processed, or mined under, or by means of, a process covered by the claims of a valid and enforceable United States patent".
[163] *Amgen, Inc., v. International Trade Commission (ITC),* (Fed. Cir. March 19, 2008).
[164] Helm, p. 185.

6 Research tool patents

6.1 What is a "research tool"?

Research tools are difficult to define as a category because there is a vast amount of products and processes that can constitute research tools. Simply put, a research tool is a product or method that is used in conducting research. Famous research tools are for instance the "oncomouse" (used in cancer research), expressed sequence tags (ESTs, used in decoding the human genome) and the genes BRCA1 and BRCA2 (used in screening breast cancer).[165]

Research tools can be defined broadly to include any tangible or informational input into the process of discovery.[166] A commonly used definition is the one given by the US National Institutes of Health (NIH). NIH has defined the term "research tool" as embracing the full range of resources that scientists use in the laboratory", which may include "cell lines, monoclonal antibodies, reagents, animal models, growth factors, combinatorial chemistry libraries, drugs and drug targets, clones and cloning tools (such as PCR), methods, laboratory equipment and machines, databases and computer software."[167] This is a broad definition of research tools since it covers things that may have other uses than just as a research tool. Whether a product or a process is a research tool thus depends on how the invention is used at a specific time.[168]

Others have advocated a narrower definition, which also covers a wide range of different products and processes but focuses on the intended purposes for which inventions were patented. The term "research tool" has been said to be limited for inventions whose main purpose is to be used in experimental research, or for inventions that are not themselves physically incorporated in the final product.[169]

The term "research tool" is hereinafter used in its broader sense, by the reason of being able to study the "research tool issue" broadly and the relevant doctrine and case law, irrespective of the intended primary uses of patented inventions and without having to distinguish between different inventions.

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[165] Mueller, *No "Dilettante Affair": Rethinking the Experimental Use Exception to Patent Infringement for Biomedical Research Tools*, 2001, pp. 12-13.
[166] Walsh et al, *Effects of Research Tool Patents and Licensing in Biomedical Innovation*, 2003, p. 287.
[167] Report of the NIH (US National Institutes of Health) Working Group on Research Tools,1998 (hereinafter: Report of the NIH on Research Tools), available at: http://www.nih.gov/news/researchtools/index.htm#recom
[168] Holzapfel & Sarnoff, p. 51.
[169] Ducor, p. 1028, Pfaff, p. 262, Mueller, 2001, p. 14.

6.2 The "research tool issue"

Research tools are often crucial in performing research and development of new and improved research tools therefore facilitates faster and more cost effective research. Research tools are specifically important in the biotechnology field where different instruments and genetic inventions such as cell lines, proteins, reagents and embryonic stem cells are used in upstream research. They are also used in safety-related experiments on new drugs, in order to verify and control that the drugs are safe and efficient, i.e. in downstream research.[170]

Research tools are, like other inventions, generally patentable if they meet the normal criteria for patentability as set out in Article 27(1) of the TRIPS Agreement: novelty, inventive step and industrial applicability.[171] Even though controversial for being patentable or not, most countries grant patents for genetic discoveries in order to facilitate and encourage innovation in the often very profitable biotechnology area. But gene patenting still causes ethical, legal and commercial debates and is feared to cause adverse effects on the cost, pace and efficiency of research.[172] The increased patenting in biotechnology inventions has lead scientists and other scholars to fear that scientific progress and development of new technology may be restrained, because of such patents' important applicability as research tools.[173] A tool inventor may be interested in using the tool in his own research and has therefore the ability to hinder or delay publicly beneficial research by not disclosing or commercialising the tool, or not licensing it to the best and most effective follow-on researchers.[174]

In short, there is a "research tool issue" when research tool patents have the ability to exclude others from using information and material, thereby "holding hostage" of future R&D. Accordingly, there is no "research tool issue" if a tool patentee commercialises the research tool and sells or license it on the open market at a reasonable price.[175]

[170] Westerlund, p. 17, Mueller, 2001, p. 12.
[171] Eisenberg, *Patented Research Tools and the Law*, National Research Council,1996, available at: http://www.nap.edu/readingroom/books/property/.
[172] OECD Report, *Genetic Inventions, Intellectual Property Rights and Licensing Practices, Evidence and Policies*, 2002, pp. 10-11, available at: http://www.oecd.org/dataoecd/42/21/2491084.pdf
[173] Clarke et al., p. 3.
[174] Freschi, p. 11, Domeij, 1998, p. 467, Cook, *Responding to the Concerns*, p. 195.
[175] Mueller, 2001, p. 15, Domeij, 1998, p. 303.

6.3 Problems imposed by research tool patents

6.3.1 Blocking effects for follow-on research

The general problem with research tools is that they in essence have the capacity to monopolize follow-on research in a specific field where the research tool is needed. Inventors of research tools may, in order to gain maximal economic returns, block technological process by controlling the tool-based research at the expense of the society.[176] According to *Strandburg*, there are two conditions for a research tool patentee to be able to control the progress of research significantly: 1) there shall be no close substitutes for the tool, and 2) there shall be no close substitutes for the research projects requiring the tool. If there are close substitutes to the tool on the market, then it does not matter whether or not the tool patentee decides to commercialise and sell, or license the tool since researchers may obtain a similar tool from someone else. The same applies if the researchers are indifferent to choose between carrying out a research project that requires the tool or solving another problem, which does not require the tool. Accordingly, if the two prerequisites are not fulfilled, the patent owner will probably market or license the research tool for being able to recover the costs involved with it.[177]

Blocking effects may arise when a research tool is of unique importance for a specific and important research, especially when there are broad patent claims. This could be the case with biotechnological research tools and their usage in the development of pharmaceuticals, and in a situation where the tool patentee considers the potential licensees as potential competitors, i.e. when a licensee's work will compete with the tool patentee's own use of the invention.[178] An example of this is so-called targets, which are cell receptors, enzymes, or other proteins implicated in a disease. Finding a target and a compound which can interact with it constitutes a promising step towards the development of a cure for the disease. Researchers that are interested and able to find a suitable compound and develop a drug are restrained to do so if the patentee refuses to license the target. The tool inventor is not interested in giving potential competitors access to a patent, which he himself could use in order to develop a commercially successful drug.[179] Thus, a blocking situation arises and technological progress is impeded or delayed if the inventor is not the fastest or most effective follow-on researcher.[180]

[176] Eisenberg, 1996.
[177] Strandburg, 2004, p. 124.
[178] Domeij, 1998, p. 474.
[179] Ibid, p. 475, Walsh et al, p. 311.
[180] Strandburg, 2004, p. 126.

6.3.2 Licensing

A tool inventor is able to choose whether he wants to license the tool, to whom and to what price. Difficulties in getting access to patented research tools due to cumbersome and expensive license negotiations or high license fees could constitute significant hurdles for researchers in need of the tool. If licenses are needed for a number of patents, this may give rise to multiple license fees. If there are too high licensing costs for research tools, researchers may be declined to conduct a research project.[181] A patent holder may also decide to license the tool on an exclusive basis, and to a company which is not the most effective researcher, thereby preventing the most effective companies from performing the tool-based research. The tool patentee may thus be able to maximise the profit gained by the patent if the first license holder does not conduct successful research since the tool patentee can continue to license the tool after the exclusive license term has expired. The progress of science is through this conduct delayed. Potential licensees may also be hesitant to enter into negotiations for a licence since they may not want to disclose their ideas of their research in its early stages.[182]

6.3.3 A "tradegy of the anti-commons" and patent thickets

The increased patenting of research tools, especially in the field of biotechnology, has been feared to result in a "tragedy of the anti-commons". According to the anti-commons theory, the proliferation of patents on upstream basic research tools will hinder the development of downstream products, creating a so-called "royalty stacking" where a researcher must obtain several licenses necessary for conducting the planned research. Innovation is hampered when many upstream patent holders make downstream research a practical impossibility since the user needs access to several upstream patents in order to develop a new downstream product. In other words, resources become underused because too many patent owners can block each other.[183] Another term for the situation with excessive patenting and overlapping patents causing problems for innovation is "patent thicket". A patent thicket is created when someone must obtain licenses from all the owners of the patents that the new product or process infringes in order to commercialise new technology.[184]

[181] Mueller, 2001, p.16, Draft Report to the Commission, p. 10, Eisenberg, 1996, Report of the NIH on Research Tools.
[182] Eisenberg, 1996.
[183] Heller & Eisenberg, *Can patents deter innovation? The Anticommons in Biomedical Research*, *Science*, 1998, p. 698.
[184] Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, 2001, p. 1.

6.3.4 Reach-through claims and royalties

A problem related to research tools is so-called reach-through claims, which are patent claims for future inventions developed through the use of a research tool.[185] Such claims are generally not considered as valid since they extend beyond the subject-matter of the research tool. Criticism towards reach-through claims is for instance that it would unreasonable for a tool patentee to profit from an invention to which he has not actually contributed, and that such patent claims are normally imprecise to what the patent is to protect and extend to.[186]

A "reach-through" element could however be incorporated in licensing agreements with so-called reach-through royalties. Through such royalties, a tool patentee gets a share of the ultimate market value of a future product developed using the licensed research tool. Such conditions can be imposed even if the final products do not embody the patented research tool.[187] US courts have started to consider to what extent reach-through royalties are permitted. [188] In *Bayer v. Housey* the district court found that Housey was not guilty of "patent misuse" when having imposed on Bayer a reach-through royalty based on sales of drugs discovered through Housey's patented method.[189] Reach-through royalties have however been considered as problematic, for example because reach-through royalties may involve long and complex license agreement negotiations[190], create a "tragedy of the anti-commons",[191] and result in higher product prices and thereby reduce the licensee's incentive to innovate commercially successful products.[192] On the contrary, reach-through royalties have also been proposed as an alternative way to increase access to patented research tools (see below at 7.4.3).

[185] Cook, 2006, p. 71.
[186] Ibid, Helm, p. 185, SOU 2008:20, p. 437.
[187] Domeij, 2000, p. 302.
[188] Cook, 2006, p. 72.
[189] *Bayer AG v. Housey Pharmaceuticals, Inc.*, 228 F.Supp.2d 467 (D.Del. 2002).
[190] Domeij, 2000, p. 468.
[191] Heller & Eisenberg, p. 699.
[192] Mueller, 2001, p. 16.

7 Research tools and experimental use

As seen in the previous chapter, research tool patents pose special difficulties for the progress of research. Inventors of research tools have the ability to restrict the access to important research tools, thereby hampering and delaying follow-on research. In order to prevent these adverse effects, the "research tool issue" has been discussed in the experimental use context and whether or not use of research tools are or should be covered by the exception. Exempting experimental use of research tools from patent infringement would be beneficial for the research where such tools are used. On the other hand, biotechnology tool patents are often the main products of biotechnology companies and a vital or the only source of income for them. An unlimited and free access to research tool patents would thus pose a threat to the highly profitable and innovative research tool industry.[193]

This chapter will study the status of research tools in Europe and the US and how research tools relate to the research exceptions. It will consider whether a broadened experimental use exception, or other alternative solutions, would balance private and public interests and enhance innovation.

7.1 The European approach towards the research tool issue

Through the enactment of the European Bolar exception in Directive 2004/27/EC, which is modelled upon the corresponding US exemption, the research tool debate reached Europe, even though to a lesser extent than on the other side of the Atlantic.[194]

7.1.1 The experimental use exception and research tool use

The predominant approach

The general view in Europe is that patented research tools shall be treated in the same way as other inventions when applying the experimental use exception. The wording of Article 27(b) of CPC 1989 has been adopted by most European countries and uses of patented inventions "related to the subject-matter of the invention" are exempted, such as experiments conducted for verifying or developing a patented invention. The experimental use exception as formulated in Article 27(b) and Article 9(b)

[193] Pfaff, p. 259.
[194] Pfaff, p. 261.

of the Draft Council Regulation on the Community Patent, does by its wording imply that the use of a patented invention as a tool for studying something else is not exempted from patent infringement, because such experiments are not performed on the patented invention itself. Since the experimental use exception is to be interpreted restrictively, an interpretation covering research tool use would expand the subject-matter of the patented invention.[195] Research performed to improve a research tool itself, for instance to improve a process or finding an additional function for the tool not mentioned in the patent claims, would be exempted since the experimentation is into the subject-matter of the invention.[196] Some typical uses of patented inventions in early stage research, which can be regarded as research tool uses, have been considered as falling under the exception because they *relate* to the subject matter of the patented invention. *Bor* has for instance given an example of a patented chemical entity for the treatment of depression. If this entity is used by a third person for comparing it with other chemical entities in order to find an improved chemical entity for the treatment of depression, the experimentation would be considered as relating to the subject-matter of the invention, even though it is not research into it. She bases this interpretation on public policy considerations and the interest of having better and new products.[197]

Borderline cases

The distinction between "experimenting on" and "experimenting with" has been criticised of not being workable in certain fields of research where a patented invention could both be used as a tool and be the subject of the experiments. Such borderline cases may arise for biotechnology inventions, as researchers do not have the full knowledge of how they work and where it is difficult to determine whether the research relates to "the subject-matter of the patented invention" or not. Proteins can for example be part of an active compound in a drug and at the same time be used as a tool in finding that effective compound.[198] Other patented research tools, in particular genetic sequences, can be useful both in diagnostic testing and in research testing.[199] An example of this are the patented breast cancer genes BRCA1 and BRCA2, which are important for diagnostic testing (clinical use) of breast cancer and for researchers involved in further medical research on cancer (research use).[200] Neither the diagnostic use nor the research use for finding, for example new gene sequences, are experiments performed into the patented subject-matter. The same difficulty occurs for patented targets (see above at 6.3.1). Experiments conducted for studying how certain compounds interact with a receptor could constitute both research into the receptor, because information about the receptor and how it interacts with

[195] Benyamini, p. 278, Cornish, p. 738, Holzapfel & Sarnoff, p. 53.
[196] Bor, *Exemptions to Patent Infringement applied to biotechnology research tools*, 2006, p. 9.
[197] Ibid, p. 10.
[198] Holzapfel & Sarnoff, p. 57, Augenstein, p. 31, SOU 2008:20, p. 370.
[199] Cook, *Responding to the Concerns*, pp. 217-218.
[200] Walsh et al, p. 312.

different substances is gained, and research with the receptor, if the aim is to study the interacting properties of the substances.[201]

Belgium & Switzerland

Belgium and Switzerland diverge from the predominant approach in Europe of not exempting research tool uses. Belgium has rather recently adopted a new provision to the Belgian Patent Act which expressly exempts activities both on and with the patented invention, i.e. research tools.[202] The purpose with this enlarged research exemption was to remove the legal uncertainty regarding the exact scope of the experimental use exemption.[203] The term "experimenting with" has been said to cover uses of a patented invention as an instrument in order to examine something else.[204] The term "scientific purposes" has replaced the term "experimental purposes". It has been explained as referring to the purpose of gathering knowledge and, according to the Ministerial Statement, there should be a broad interpretation of the term so that it encompasses both acts for purely scientific purposes and acts performed for a mixed scientific and commercial aim.[205] Examples of such mixed purposes could be academic research with a commercial aim or basic research performed by pharmaceutical companies. However, the purpose should mainly be scientific in nature for the exception to apply. Purely commercial acts, such as clinical trials with the sole aim of obtaining a regulatory approval, are not covered by the exception but are instead covered by the Belgian "Bolar" exception.[206] It is not yet clear how the Belgian courts will interpret the new experimental use exception[207] and it has been criticised for diminishing the incentive to develop new research tools, thereby being disadvantageous for the research tool industry.[208]

Switzerland, just as its neighbour Austria, lacks a statutory experimental use exception but there is a current proposal for an amendment to the Swiss Patent Act. The proposed new Articles 9(1)(a) and (b) correspond to the exceptions elsewhere in Europe with regard to CPC and Directive 2004/27/EC. In addition to this, the proposed new Article 40(b) involves a system for compulsory licensing for research tools. According to this article, there is a right to obtain a non-exclusive license for experimental uses of biotechnological research tool patents, without any need to show specific requirements such as competitive abuses.[209]

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[201] Holzapfel & Sarnoff, p. 57.
[202] Article 28 of the Belgian Patent Act settles that "the exclusive rights deriving from a patent do not extend to acts on and/or with the patented invention for scientific purposes". Translation by Cook, 2006, p. 144.
[203] Van Overwalle & van Zimmeren, *Reshaping Belgian Patent Law: The Revision of the Research Exemption and the Introduction of a Compulsory License for Public Health*, 2006, p. 3.
[204] Ibid.
[205] Cook, 2006, p. 145.
[206] Van Overvalle & van Zimmeren, p. 3.
[207] Ibid, pp. 9-10.
[208] Cook, 2006, p. 145.
[209] Cook, 2006, pp. 147-148.

7.1.2 Unclear scope of the European Bolar exception

The language of the European Bolar exception provided by Directive 2004/27/EC has been regarded as being ambiguous and has been implemented differently among Member States, as seen above in section 4.2.2. There have also been different opinions on whether the exception extends to research tools. Some countries have implemented the Directive broadly so that it is not limited to generic products. For instance, the German exception does not distinguish between different types of patents used in trials aimed at obtaining market authorisation. An interpretation could be that research tool patents are exempted, since research tools may be used and be necessary for performing clinical trials.[210] In the UK, the Intellectual Property Office has stated that the UK's Bolar exception extends to development, testing and use of associated analytical techniques. Thus, not only patented drugs or other substances, but also analytical techniques, if related to the activities of gaining information for a regulatory approval will be allowed.[211] If the term "analytical technique" includes patented methods[212] used in laboratory research, research tools may be exempted under the UK exception. Whether this would be the case is however uncertain.[213]

Scholars have discussed whether the exception covers uses of research tools that are "necessary" in order to obtain a regulatory approval and how far back in the R&D process the exception stretches. It has been held that the exception does not cover uses of research tools since these are of general application and not related to the product at scope.[214] Research tool use in early stage research is also too remote from clinical trials and not directly necessary to obtain a market authorisation. Thus, it would not fall under the European Bolar exception.[215] On the other hand, the term "medicinal products" in the wording of Article 10(6) of the Directive could be read as only referring to certificates, and not "patent rights for medicinal products". With such an interpretation, any patent would be exempted, and not only drug patents. Would this mean that tool patens are included? An argument against such reading is that the regulatory approval exception was enacted under the Directive for medicinal products and not under the EC patent legislation.[216]

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[210] Pfaff, p. 271, Augenstein, p. 31.
[211] UK Intellectual Property Office, *The Bolar Exemption - activities covered by the exemption*, available at: http://www.ipo.gov.uk/policy/policy-issues/policy-issues-patents/policy-issues-patents-pharmaceutical/policy-issues-patents-pharmaceutical-activities.htm.
[212] According to NIH's definition, a method could constitute a research tool, see section 6.1.
[213] Pfaff, p. 272.
[214] Life Science Update, Bird & Bird Newsletter, 2005, p. 6, available at: http://www.twobirds.com/english/publications/newsletters/display_results.cfm?newsletter=28090.
[215] Holzapfel & Sarnoff, p. 64.
[216] Pfaff, p. 273.

Holzapfel and *Sarnoff* consider that the European Bolar exception was not intended to affect the status of research tools and the balance between research tool inventors and research tool users, as it was not mentioned in the preparatory work to the Directive. They argue that uses of research tools in obtaining a regulatory market authorisation for another invention are rare, but that research tool use could be exempted if it is "necessary" for an approval.[217] As regards the German exception, they hold that the German legislator did not have the intention to make the scope of the regulatory approval exception broader than the experimental use exception, and thus modify the well-established rulings in *Klinische Versuche I* and *II*.[218] *Pfaff* agrees with this and holds that the Bolar exception must be interpreted in light of the experimental use exception, to which the Bolar exception is considered as an additional provision. Since the experimental use exception only covers research that is related to the subject-matter of the patented invention, thereby not exempting research tool use, only patented inventions incorporated in the future drug (the subject-matter) are exempted by the Bolar exception.[219]

Augenstein on the other hand argues that all trials and means used in clinical trials are exempted from patent infringement, because pharmaceutical researchers always aim at developing a product for the market. The Directive's aim of facilitating clinical trials would not be achieved if the exception is limited to trials required by law. If preparatory research were not included, patent holders of drug compounds would be able to hamper the early stage work, thereby delaying the development of generics. He further claims that this was not the intent of the Directive, and thus all trials related to market authorisation should be exempted, even though this would deprive research tool patents of their value.[220]

7.2 The US approach towards the research tool issue

The public concern in the US regarding the "research tool issue" is evident from the number of articles written by patent law scholars. The research tool issue has been debated with regard to both the experimental use exception and the statutory regulatory approval exception.

[217] Holzapfel & Sarnoff, p. 65.
[218] Pfaff, pp. 272, Holzapfel & Sarnoff, p. 66.
[219] Pfaff, p. 272.
[220] Augenstein, p. 32.

7.2.1 Why a narrow experimental use exception constitutes a problem

Basic research is mainly performed by universities, other non-profit research institutions, and research companies such as biotechnology firms. For their scientific work it is crucial to have access to patented inventions.[221] As mentioned above at 5.4, the US experimental use exception only extends to non-commercial experiments, and do not distinguish between research on or with a patented invention. *Madey v. Duke* settled that the common law exception is very narrow, which has raised concerns for a potential chilling effect on research due to increased costs and difficulties in obtaining access to patented inventions, including those used as research tools.[222] The limited scope of the experimental use exception has been held to be unworkable in today's research environment where the distinction between commercial and non-commercial purposes is blurred. Much basic research is performed in collaboration between universities and the industry through partnerships, joint ventures or sponsored research.[223] The commercialisation of universities' inventions has also increased through the enactment of the *Bayh-Dole Act*, which allows universities to patent inventions in order to promote technology transfer to commercial companies.[224] Accordingly, the commercial/non-commercial distinction and the difficulties for universities and scientists to obtain and use patented inventions in their upstream research, without risking patent infringement, have been feared to cause adverse effects on downstream research.[225]

7.2.2 Does the current interpretation of the Bolar exception cover research tools?

With the narrow experimental use exception, the regulatory approval exception has practically become a way to exempt research use of patented inventions.[226] The Bolar exception has been interpreted to cover activities that are performed in all stages of drug development and that are reasonably related to gather information for an FDA approval. The term "reasonably related" has been interpreted very broadly to cover almost anything that is believed to be relevant for an application to FDA. In *Eli Lilly* the Supreme Court established that the term "patented invention" in the regulatory approval exception included a wide range of patented inventions for which a regulatory approval is needed.[227] Research tools may fall under one of these categories. The question is therefore whether the broad Bolar exception covers patented research tools as well, if a use of a research tool is

[221] Ducor, p. 1027, Report of the NIH on Research Tools.
[222] Ibid, Holzapfel & Sarnoff, p. 19, Mireles, p. 278.
[223] Mueller, 2001, p. 33.
[224] 35 U.S.C. § 200 (1980).
[225] Report of the NIH on Research Tools.
[226] Strandburg, *Users as Innovators: Implications for Patent Doctrine*, 2007, p. 24.
[227] *Eli Lilly v. Medtronic*, at 674.

reasonably related to the gathering of information to the FDA, both when used in clinical trials and in the development of new drugs. Some case law has pointed towards this direction.[228]

The research tools debate was triggered by CAFC's first ruling in *Merck v. Integra*. Even though none of the parties had claimed that the peptides at scope had been used as research tools, the Court discussed the matter and held that the value of research tool patents would be diminished if § 271(e)(1) applied to general and upstream research. By distinguishing between basic scientific research and clinical trials, the Court therefore wanted to protect the interests of the patent holders.[229] In criticising the majority's ruling, dissenting Judge Newman held that the "use of an existing tool in one's research is quite different from study of the tool itself" and meant that only patents which are expected to obtain FDA approvals are exempted under the regulatory approval exception.[230]

It was hoped that the Supreme Court would clarify the scope of the Bolar exception.[231] The Supreme Court clarified that § 271(e)(1) is not limited to activities performed in the clinical trials phase, but applies to activities undertaken in all phases of research, as long as they are reasonably related to obtaining FDA approval. However, the Court declined to consider whether uses of research tool patents could be brought under the exception. In referring to the dissenting opinion of Judge Newman, the Court stated that it "therefore need not – and do not – express a view about whether, or to what extent, § 271(e)(1) exempts from infringement the use of 'research tools' in the development of information for the regulatory process."[232] This referral has been interpreted differently. While some consider that the Court expressly agreed with Judge Newman's opinion[233], others have found that the Court did not rule out the possibility of applying the exception to research tool patents used in generating information to the FDA.[234]

Interpretation in favour of a broad Bolar exception

The wording of the regulatory approval exception does not limit the exception to patented compounds being the subject of the FDA approval or excludes research tool patents. In addition, the ruling in *Merck v. Integra* could be interpreted as meaning that the Bolar exception covers every patented invention which can be used to produce information for an FDA submission. Here, the focus lies on the term "patented invention" in the wording of § 271(e)(1), which refers to *all* types of patents without treating different classes of inventions differently, and hence without distinguishing

[228] For instance in the case *Bristol-Myers Squibb v. Rhone-Poulenc Rorer* in 2001.
[229] *Merck v. Integra*, 331 F.3d 860 (Fed. Cir. 2003), at 866-868.
[230] Ibid, at 878.
[231] Holzapfel & Sarnoff, p. 3.
[232] *Merck v. Integra*, 545 U.S. 193 (2005), at 205, fn 7.
[233] Pfaff, p. 266.
[234] Feit, *The Safe Harbor Infringement Exemption Under the Hatch-Waxman Act, Finally Defined*, 2005, p. 28, Westerlund, p. 17.

research tools.[235] In addition, the provision has an explicit exception for the class of inventions relating to "new animal drug or veterinary biological products" and this could imply that the legislator did not intend to exempt a different class, such as research tools.[236] Another argument for a broad exception is that the courts have not differentiated between the manners in which inventions could be used in the in the regulatory approval process. If the Congress would have intended the exception to cover only patented inventions that are themselves the subject of a regulatory approval, the formulation "the patented invention" or otherwise would have been used in order to make the intent clear. Seemingly, the regulatory approval exception could be interpreted as exempting research tools made, sold or used solely for uses in regulatory approval applications even though they are not themselves the subject of the approval.[237]

Arguments against a broad interpretation

§ 271(e)(1) could be read as "a patented invention […] solely for uses reasonably related to the development and submission of information *about that patented invention*." This interpretation was advocated by dissenting Judge Rader in CAFC's second ruling. He held that the Supreme Court only had applied the exception to the selection and perfection of patented compounds in preclinical studies leading to FDA approval, but not to methods and tools used in order to evaluate, analyze and assess the specific features of such compounds in the R&D process.[238] The Supreme Court therefore held the regulatory approval exception to apply solely to patented compounds leading to FDA approval for *that* compound, and not those patented methods or process tools which were only used in the laboratory work. A broader application for drug development activities beyond those necessary to acquire a market authorization would, according to Judge Rader, be harmful for the development of new and improved research tools.[239]

Pfaff holds that the Bolar exception only applies to patents actually embodied in the final product and that another interpretation would contradict the intent of the Congress. The aim with § 271(1)(e) was to prevent a de facto extension of patent terms, and since research tools are normally not subject for FDA approval there would be no point in applying the exception to research tool patents. Consequently, the Congress did not intend the Bolar exception to cover research tools patents because they would not be affected by the delays caused by a regulatory approval process.[240]

[235] Pfaff, p. 265, Patel, pp. 422-423.
[236] Feit, p. 28.
[237] Holzapfel & Sarnoff, p. 16.
[238] *Merck v. Integra*, 496 F.3d 1334 (Fed. Cir. 2007), at 1349.
[239] Ibid, at 1352.
[240] Pfaff, p. 266.

Even though the Supreme Court did not have the intent of exempting research tools, the extended scope of the regulatory approval exception has nonetheless been considered as a threat to the research tool industry.[241] Problems with lost licensing revenues may arise since the Bolar exception has been held to apply to patented inventions reasonably believed to be a part of the end product.[242] As patented compounds are often are used in finding and developing new drugs, such as the peptides in *Merck v. Integra*, and in downstream research, it could be rather easy for tool users to argue such conceivable relation, thereby avoiding license fees and patent infringement claims.[243]

Uncertainty after Merck v. Integra

The scope of the exception towards research tools is still considered as unclear and it has been feared that this uncertainty will lead lower courts to disregard to make any classification of research tools.[244] The current uncertainty has for instance been expressed in *Classen Immunotherapies v. King Pharmaceuticals*[245] where a patentee sued a competitor for infringement of its patented methods for identifying and commercialising new uses of existing drugs.[246] The district court held that the Supreme Court in *Merck* had "declined to rule on whether the use of research tools was protected under § 271(e)(1)" but found that an extension of the statutory exception to cover the use of the tools at scope was justified by the language in *Merck* and by "a plain reading of the statute".[247] In *Benitec Australia v. Nucleonics* the CAFC considered § 271(e)(1) to have "uncertain contours" following the Supreme Court's decision in *Merck.*[248].

7.2.3 Towards the European approach?

The uncertain scope of the research defence in the US has lead to claims for a reform or an amendment of the Patent Act, where the research tool issue is addressed.[249] The US Congress, scholars and courts have, in trying to find a solution, glanced at the broader European type of experimental use exception and the distinction between "experimenting on" and "experimenting with". In 1990 the Congress issued a legislation proposal aimed at permitting research on a patented invention but excluding research

[241] Westerlund, p. 17, Pfaff, p. 267, Patel, pp. 431-433.
[242] Pfaff, p. 267.
[243] Westerlund, p. 17.
[244] Wiegel, *Was the FDA Exemption to Patent Infringement, 35 U.S.C. § 271(e)(1), Intended to Exempt a Pharmaceutical Manufacturer's Activities in the Development of New Drugs?*, 2007, p. 12, Lewis, Mandrgoc and Salinas-Stern, *Patent Litigation – Are Safe Habors for Research Tool Patents Still at Sea?*, 2008, p. 37.
[245] *Classen Immunotherapies, Inc. v. King Pharmaceuticals, Inc*., 466 F.Supp.2d 621, (D. Md. 2006).
[246] Ibid, at 623-624.
[247] Ibid. at 625.
[248] *Benitec Australia, Ltd., v. Nucleonics*, Inc., 495 F.3d 1340 (Fed. Cir. 2007), at 1349.
[249] Holzapfel & Sarnoff, p. 73.

with a patented invention.[250] The proposal for a statutory experimental use exception was not adopted due to resistance from groups concerned that such exception would apply to research tool patents.[251] Nonetheless, the European approach has been discussed and advocated in other instances, such as in the dissenting opinions of Judge Newman and Judge Rader in *Merck v. Integra* and in doctrine.[252] Judge Rader stressed the value of protecting research tool patents but allowing experiments performed in order to improve the tools themselves, and referred to the German cases *Klinische Versuche I* and *II*.[253] The American Intellectual Property Lawyer's Association (AIPLA) and HUGO, the international organisation of scientists involved in human genetic research, have also expressed support for the European statutory model of the experimental use exception covering all research related to the subject-matter of a patented invention.[254] Adopting a more robust experimental use exception similar to the European one is also considered as a way to avoid or mitigate the negative impact of a tragedy of the anti-commons because it would remove obstacles to basic research.[255]

7.3 Exempting research tool use – a solution?

A broadening of the experimental use exception to include the use of research tools has been suggested as a solution to the "research tool issue". The difficulties in obtaining access to patented research tools due to high license fees, patent thickets, risks of patent infringement actions and an unwillingness of the tool patentee to license at all, are arguments for a broadened exception.[256]

Many research tool inventions are the result of user innovation, meaning that the development of research tools is made by researchers for their own use. Even if researchers were not able to prevent others from using their tools, they would still invent them for performing their own research. With regard to the importance of user innovation, *Strandburg* has proposed a blanket exception for research tool use.[257] Her proposal is based on an analysis how the incentives to invent, disclose and disseminate research

[250] Patent Competitiveness and Technological Innovation Act, H.R. 5598, 101st Cong. § 402 (1990).
[251] Holzapfel & Sarnoff, p. 8.
[252] Wiegel, p. 12, Holzapfel & Sarnoff, p. 8, Report of the NIH on Research Tools, Strandburg, 2004, p. 119, Ducor, p. 1026.
[253] *Merck v. Integra*, 496 F.3d 1334 (Fed. Cir. 2007), at 1353.
[254] Cook, 2006, p. 124, HUGO Intellectual Property Committee, *Statement on the Scope of Gene Patents Research Exemption, and Licensing of Patented Gene Sequences for Diagnostics*, 2003. Available at: http://www.hugo-international.org/PDFs/Statement%20on%20the%20Scope%20of%20Gene%20Patents,%20Research%20Exemption.pdf
[255] Mireles, p. 276.
[256] Bor, p. 11.
[257] Strandburg, *Users as Innovators: Implications for Patent Doctrine*, 2007, pp. 5-6.

tools of four major types of tool inventors (non-profit and commercial researchers, tool suppliers and licensing firms) would be affected by a research exception for research tools. Generally, she finds that an exception would be socially beneficial since the availability for research tools would be enhanced, whilst preserving sales-based incentives for tool suppliers and licensing firms and causing a minimal impact on the incentives of researcher innovators.[258] Ambiguous effects may however arise in the case of commercial research innovators with non-self-disclosing research tools. In such cases, the innovators have the option of keeping the tools as trade secrets. A trade secret option would provide incentives to invent, but the inventor would in most cases not patent and disclose the tool in order to gain in-house benefits from the tool. Whether a research exception for research tools would be socially beneficial thus depends on whether the benefits of having freely revealed and wide spread research use of patented inventions outweighs the social costs of increased trade secrecy and delayed disclosure of new technology, which commercial tool inventors could choose.[259]

According to *Strandburg*, the benefits for the society as a whole of having earlier availability of many research tools is more important than avoiding a delayed disclosure of some research tools. Consequently, she proposes a blanket exception to remove the obstacles provided by patented research tools. As researchers both invent and use research tools, they would still reap economic benefits even if they do not have full control over their inventions. Positive effects would also for instance be lower prices, alleviating the concerns for impeded university research, and a solution for the difficult line-drawing between "experimenting on" and "experimenting with". A blanket exception could however cause problems in situations where it is hard to distinguish research use from other uses, for example in the case of diagnostic tests. It could also lessen the incentives for commercial tool manufacturers to invest in the development of research tools that are difficult to invent but easy to produce and copy.[260]

Critics to the idea of exempting research tool uses under an experimental use exception argue that tool inventors would not be economically compensated, thereby reducing the incentives to invent and improve research tools. This would be harmful for the scientific and technological progress.[261] Research is the primary market for inventions intended to be used as research tools and an experimental use exception for research tools would practically mean that a tool inventor freely would disclose their inventions for the public good.[262] Inventors could be forced to keep their inventions (non-self-disclosing inventions) in-house as trade secrets to protect the invention instead of seeking a patent and disclose their new

[258] Strandburg, 2007, pp. 29-44.
[259] Ibid, pp. 38-39.
[260] Ibid, pp. 44-46.
[261] Mueller, 2001, p. 40, Patel, p. 425-26, Eisenberg, 1996, Mireles, p. 276, Iles, p. 63.
[262] Holzapfel & Sarnoff, p. 55.

technology.[263] From an economical point of view, it is not economically efficient, nor in the society's interest, that resources are spent by different researchers for developing similar research tools having the same application in research.[264] A broadened research exception would also not be useful or necessary in cases where research tools are easy and widely available on an anonymous market, for instance via a supplier catalogue. In this situation, a tool patentee cannot differentiate those consumers of the invention using it as a research tool.[265]

7.4 Alternative solutions

Various proposals on how to deal with the "research tool issue" and how to properly balance private and public interests, have been presented as alternatives to a broadened scope of the research exception.

7.4.1 Exempting academic or basic research

As much basic research is performed by universities and other non-profit research institutions, it has been suggested that academic researchers should be exempted from patent infringement liability when using patented inventions in their research. *Thai* and *Dreyfuss* have proposed a model where universities are exempted from patent infringement but where there is a research tool disclosure requirement if they file a patent application for an invention developed through the use of a research tool.[266] In addition to the disclosure requirement, *Thai* has proposed a predetermined research fee, which would oblige university users to compensate research tool holders. This model would hold universities accountable for commercial activities without having unduly delays and costs related to the access of patented research tools, and would at the same time protect the interests of the tool patentees.[267]

The proposal of exempting academic research has been criticised due to the blurred line between academic and commercial research, and between basic and applied research, in the modern research environment. Traditionally, basic research was considered as the main activity of universities while the private sector was involved in applied research.[268] Today there are however close connections between academic research institutions and the industry, where inventions made by universities often are used for the industry's commercial purposes. Universities may benefit from their patents, either

[263] Bor, p. 12.
[264] Strandburg, 2004, p. 125.
[265] Domeij, 2000, p. 303, Mueller, 2001, p. 15.
[266] Dreyfuss, *Protecting the Public Domain of Science: Has the Time for an Experimental Use Defence Arrived?*, 2004, pp. 471-472, Thai, *Toward Facilitating Access To Patented Research Tools,* 2004, pp. 393-396.
[267],Thai, pp. 393-396.
[268] WHO Report 2006, p. 38.

economically or by an enhanced reputation. Basic research is also increasingly performed by commercial companies.[269] An exception for academic researchers could be unfairly discriminatory towards the industry's research.[270] Commercial researchers would not be interested in paying for a research tool license, when they know that they must compete with non-profit institutions obtaining the tool for free. Commercial tool inventors would loose revenues and not be able to recoup their costs if the tools could be used freely both in academic and basic research.[271] Exempting basic research is not a solution to the problem of getting access to research tools since a license could still be denied when the researcher intend to perform applied research. The researcher may thus not perform the basic research in the first place if he believes that it will not be possible to develop a product or process further on in the R&D process.[272] Favouring basic research before applied research would also be at odds with the rationale underlying the patent system, which is that granting individual economic benefits will result in benefits for the society as a whole.[273]

7.4.2 Compulsory licensing

Through a compulsory licensing scheme, research dependent on the accessibility of important research tools would be enabled and the tool inventor would obtain compensation in return. Compulsory licensing of research tools could therefore be a possible solution in situations where a tool patentee does not make use of the tool or when it is motivated by a particular public interest.[274] European patent law provides for compulsory licensing as a competition remedy when intellectual property rights are abused, while the possibility of granting such licensing is limited in the US.[275] As seen above in 7.1.1, Switzerland has proposed compulsory licensing for biotechnology inventions. US scholars have also proposed a compulsory licensing scheme in the light of the narrow experimental use exception[276], as well as the comparable patent misuse doctrine to improper uses of patented research tools.[277]

According to the Swedish Committee on biotechnology patents, a compulsory licensing scheme could be beneficial in order to promote R&D and to avoid situations where research tool patents block important follow-on research. The Committee has however abstained from proposing an

[269] Holzapfel & Sarnoff, pp. 78-79.
[270] Bor, p. 13.
[271] Strandburg, 2004, p. 137.
[272] SOU 2008:20, p. 420.
[273] Holzapfel & Sarnoff, p. 79.
[274] Cook, *Responding to the Concerns*, p. 220, SOU 2008:20, p. 427.
[275] OECD Policy Brief, *Intellectual Property and Competition Policy in the Biotechnology Industry*, 2005, p. 5, available at: http://www.oecd.org/dataoecd/36/4/35040373.pdf.
[276] Thomas, *Protecting Academic and Non-Profit Research: Creating a Compulsory Licensing Provision in the Absence of an Experimental Use Exception*, 2007, p. 355. Strandburg, 2004, p. 144.
[277] Westerlund, p. 18.

expanded compulsory licensing scheme, since their analysis was limited to a possible extension with regard to biotechnology tools. The Committee considered that the effects of compulsory licensing for research purposes must be comprehensively examined in all fields of technology.[278]

Critics to compulsory licensing of research tools, in particular pharmaceutical companies, claim that it curtails the right of the patent owner in a too large extent.[279] A broad compulsory licensing scheme, such as the Swiss proposal, where the tool patentee practically has no possibility to deny licensing based on business considerations and where the exclusive patent rights become a way to compensate economically, may lead to a decrease in patented tools. Also, if a tool inventor is forced to license the tool to competitors, these competitors would not have the same incentive to invest in inventing around the patent, and potential improvements may thereby be lost.[280]

7.4.3 Reach-through royalties

It is often difficult for the research tool licensee to determine a value of the tool that is appropriate to the final result of the research tool use. The tool may be used only once in an experiment, but may be the tool needed to discover a groundbreaking and commercially successful new drug. Reach-trough royalties in license agreements could overcome the difficulty of determining a proper value of the tool, and at the same time encourage innovation through a secured future profit. Research tool patents may then be used freely in research, while the tool patentee receives a reward if the tool is used in the development of a commercial product.[281] As an alternative, *Mueller* suggests a modified model, a "development use" exception, where a tool may freely be used for developing a product but where the tool inventor would receive reach-through royalties only when the tool is embodied in a product put on sale. While the tool inventor receives profit, the tool user is spared from burdensome license bargaining, payments for tools that may turn out to be unnecessary and blocked access to the tools.[282]

A licence system with reach-trough royalties could however result in patent misuse when royalty payments improperly extend beyond the patent term of the licensed research tool.[283] This situation could especially arise in the biotechnology field where R&D and clinical trials of new pharmaceuticals take several years, and where the drugs are sold long after the actual use of the research tool in the R&D.[284] Reach-through royalties may involve long

[278] SOU 2008:20, p. 430.
[279] Bor, p. 14.
[280] OECD Policy Brief, 2005, p. 5.
[281] Hultqvist, pp. 285-286.
[282] Mueller, 2001, p. 59.
[283] Holzapfel & Sarnoff, p. 22.
[284] Lewis, Mandrgoc and Salinas-Stern, p. 37, Mueller, 2001, p. 61.

and complex license agreement negotiations[285], create a "tragedy of the anti-commons" [286], and there is no established method on how to best calculate reach-through royalties to give the inventor proper recovery.[287] Moreover, the tool patentee may loose control over the invention and only receive payment if the final product is successfully commercialised.[288] An increased use of reach-trough royalties could also discourage follow-on research since such royalties would result in higher prices of the product and thereby reduce the licensee's incentive to innovate commercially successful products.[289]

7.4.4 Fair experimentation exception

The fair use doctrine in the US copyright law, which provides that certain unlimited but publicly beneficial uses of copyright protected material are not considered as infringement, has been suggested as a proper way of balancing the patent system. Such an analogue mechanism in the patent law would permit an exception for "fair experimentation".[290] *O'Rourke* has proposed a five step-test where the courts would consider five factors relevant for a fair use finding: 1) the nature of the advance represented by the infringement; 2) the purpose of the infringing use; 3) the nature and strength of the market failure that prevents a license from being concluded; 4) the impact of the use on the patentee's incentives and overall social welfare; and 5) the nature of the patented work.[291] A fair experimentation exception would be beneficial in that it would not discriminate between different sectors, it would relate to public interest concerns and provide courts with greater flexibility.[292] The proposed exception has however been criticised for creating further uncertainty and complex legal issues. There would be difficulties in obtaining clear guidance on how to best balance the interests of the public versus the interest of patent holders.[293] The fair experimentation idea has also been considered as too revolutionary, especially in the light of the increasing demands for a reform of the research exception in the US.[294] The scope of application for such an approach would also be limited due to the fact that there is no "fair use" equivalent in European copyright laws.[295]

[285] Domeij, 1998, p. 468.
[286] Heller & Eisenberg, p. 699, OECD Report 2002, p. 16
[287] Lewis, Mandrgoc and Salinas-Stern, p. 37.
[288] Bor, p. 20.
[289] Mueller, 2001, p. 16.
[290] O'Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 2000, p. 1181.
[291] Ibid, pp. 1205-1209.
[292] Holzapfel & Sarnoff, p. 76, Dent et al, p. 37.
[293] Holzapfel & Sarnoff, p. 77.
[294] Cook, 2006, p. 113.
[295] Ibid.

7.5 Is there really a problem?

Although much concern have been raised over the immense increase in biotechnological research tools and its adverse effect on R&D, studies have also indicated that research tools patents have not substantially impeded innovation in the biotechnology and pharmaceutical field – neither in the academic nor in the private industrial research sectors. Such empirical studies have principally been conducted in the US.

In a study conducted by *Walsh et al* in 2002, 70 interviews were held with intellectual property attorneys, business managers and scientists from biotechnology firms, pharmaceutical companies and universities, in order to consider the effects of research tool patents on industrial and academic biomedical research.[296] The purpose with the study was to investigate whether research tool patents had resulted in an "anti-commons" effect, where multiple patents relate to a product or process blocked new technology and follow-on research.[297] In their report, the authors hold that the proliferation of patents, especially on research tools, has lead to a more complex patent landscape. The study nonetheless shows that multiple research tools patents have not caused any specific problems or a "tragedy of the anti-commons". Almost none of the respondents had given up or not conducted projects being commercially or scientifically promising due to problems of getting access to research tools.[298] Neither had R&D projects seriously been threatened by increased license costs and royalty stacking. The majority of the respondents had considered that the costs for research tools, although increased, are reasonable and praiseworthy compared to the productivity gains that the tools conferred.[299]

The explanation provided by *Walsh et al* to the result of the interviews is that private and public researchers have developed "working solutions" to research obstacles. These solutions constitute of combining inter alia licensing, inventing around patents, locating research abroad, validating patents in court, using publicly available tools, and infringement. Moreover, patent owners, both in the private and public sphere, seldom enforce their patent rights and hold other researchers liable for patent infringement. However, the working solutions could impose high social costs, such as a social waste of resources when researchers have to circumvent patents, use substitute research tools or invent around patents instead of getting access to existing patented research tools. There are also social costs involved in court challenges and license negotiations.[300]

Bor, in examining the UK experimental use exception, considers that the system is self-regulating and that the present system is working since

[296] Walsh et al, p. 287.
[297] Ibid, p. 392.
[298] Ibid, p. 303.
[299] Ibid, pp. 300-301.
[300] Ibid, pp. 331-332.

"working solutions" are utilised. She argues that tool patent owners rarely take action against those performing early stage research using the patented tool, partly because it is difficult to know when a tool has been used and partly because the costs involved in a lawsuit often exceeds the value lost due to the infringement.[301]

The Swedish Committee on Biotechnology Patents conducted a survey in 2005 where a majority of the respondents held that patented research tools had not caused problems for their research, and that the granting of research tool patents was balanced. The number of respondents was low and the result should therefore be interpreted carefully.[302] According to the Swedish Committee, it cannot be established that patented research tools cause any specific problems for research or harm the balance between public and private interests. The licensing system is believe to work well, mainly because academic research institutions are not held guilty of patent infringement as long as the research does not develop into a commercial product. In addition, universities appear to be unaware of patent provisions governing their use of patented inventions. [303]

The OECD considers that there is insufficient empirical evidence on how different scope of the research exceptions and research tool patents cause problems to R&D.[304] One of the conclusions from an OECD conference in 2006 was that more and better empirical studies are needed to reach more clear findings on how the accessibility of certain patented inventions affect research.[305]

[301] Bor, p. 15.
[302] SOU 2008:20, p. 414.
[303] Ibid, pp. 423-424.
[304] Dent et al, p. 45.
[305] OECD Summary Report from the Conference on Research Use of Patented Inventions, May 2006, p. 3, available at: http://www.oecd.org/dataoecd/21/38/37868230.pdf.

8 Analysis

Europe's and the US' experimental use exceptions and regulatory approval exceptions are quite different from one another, both in approach and scope. These disparities entail competition concerns due to the close relationship between the scope of the research exception and R&D. Researchers in countries with narrow exceptions could be put on a competitive disadvantage compared to researchers in countries with broader exceptions, as the latter can perform research on patented inventions in a larger extent. Researchers would also be more inclined to perform research in countries with broad exceptions, and to patent an invention in a country with narrower exceptions so that the profit can be maximised. Harmonising efforts within the EU and between Europe and the US would presumably create legal certainty, a better competitive climate and increase the value of patents overall. The question is how an optimal research exception is formulated in order to best stimulate R&D, while balancing private and public interests.

The experimental use exception found in most European countries is held to be broader than its counterpart in the US. This is true with respect to the subject-matter of the patent. As long as experiments are conducted on the subject-matter they are exempted from patent infringement. In Belgium, also research performed with a patented invention is exempted. The US common law exception is not comparable to the "European-type" experimental use exception, as it is very narrow and only applicable to research with non-commercial purposes. This exception is perhaps more similar to the exception for private and non-commercial uses in Europe. On the contrary, the US regulatory approval exception has a very broad scope with respect to the range of activities permitted on patented inventions. It is however limited to medical products.

The divergences in Europe as regards the scope of the experimental use exception concern whether it covers clinical trials or not. With respect to generics, the enactment of the European Bolar exception has clarified the situation. When it comes to new products and processes the situation is more unclear. Some Member States have held the Bolar exception to cover trials for new medical indications, while others have not. Finding a new indication of a patented drug is covered by the experimental use exception because new knowledge of the patented is gained. However, in developing a new product based on these findings and making comparable studies with the original patent, a patented invention is actually used, as it is not research into its subject-matter. If clinical trials are not covered by the experimental use exception or the Bolar exception, the researcher must obtain a license from the patent holder. If a license is not granted, the development and marketing of the new drug is delayed. This would contradict the aim with both the exceptions, which is to stimulate innovation and to have new and improved products on the market. If the experimental use exception is broadened to cover clinical trials, a license is still needed in order to market

the product prior to the expiration of the patent term. A patent holder could thus prevent the marketing of a new drug as long as he has exclusive rights. With a Bolar exception covering clinical trials of new products, the product would still not be marketed until the patent term has expired, thereby not ripping the patent owner of any profit. The broad approach taken in Germany through *Klinische Versuche I* and *II* could be considered as reasonable as it takes into account both the interest of the patent owner and follow-on researchers. A harmonised approach throughout Europe towards the experimental use exception would be beneficial and serve EU's internal market objective. As regards the inconsistent implementation of the "Bolar" exception, the ECJ will probably interpret the intent behind Article 10(6) of Directive 2004/27/EC in time.

The US' experimental use exception is based upon a distinction between commercial and non-commercial research. In today's research environment, where much basic research is performed by companies or by universities in collaboration with the industry, this distinction causes concerns. On the other hand, the broad regulatory approval exception, seemingly exempting all experimental uses of patented inventions reasonably related to obtaining a marketing approval, also involves certain problems. Are patent holders able to recoup their costs if uses of their patented inventions in early stage research are exempted? Could it not be said that almost all basic research have the aim of being, at least in the end, developed into a commercial drug for which a FDA approval is needed? Do researchers really conduct expensive and time-consuming experiments if they do not believe that they will have certain expected and useful results?

The uncertain scope of the experimental use and the Bolar exceptions after *Merck v. Integra* causes most concern in respect to research tools. The question is whether the Bolar exception only covers uses of patented inventions that are themselves the subject of the FDA application, or also inventions that have been used purely as "tools". The Supreme Court's ruling could be held as exempting only those patents which are actually incorporated into the final product, thereby being in line with the European approach. However, it is a matter of definition of what constitutes a research tool. Had the distinction between "experimenting on" and "experimenting with" been applied in *Merck v. Integra*, the research on the peptides would probably not have been considered as infringing, since the purpose of using Integra's patented peptides was to gain new knowledge about their features and workability. However, the status of research tools under the research exceptions is currently uncertain, and defendants in patent litigations will certainly argue a broad interpretation of the Supreme Court's opinion.

Defining different uses of patented inventions in an appropriate way is necessary as regards research tools. There is a danger in classifying research tools as group, since patented inventions can be both used as tools in order to investigate something else, and the subject-matter of the research. Having an experimental use exception only covering research related to the subject-matter of the patented invention appears to be a constructive and clear

approach. Allowing experiments conducted *on* research tool does not impinge on the patentees exclusive rights of exploiting the patent commercially. Exempting research performed *with* a patented tool, i.e. using it for its purpose, would however be harmful to R&D because the patentee could either loose incentives to invent or decide to keep the tool secret. Even though it might be difficult in some cases to distinguish between experimentation on and experimentation with a research tool, there is no merit in classifying all research tools as a group, but instead preferably deal with such borderline cases on a case-by-case basis.

Distinguishing between different uses of patented inventions may prevent threats to the research tool industry. However, the "research tool issue", i.e. the problems of getting access to patented research tools, is left unsolved. A research exception for research tools would certainly benefit certain tool users' R&D. One must keep in mind that what constitutes a research tool for someone, is considered to be someone else's commercial end product. Exempting research tool use could diminish the value of the patent and decrease the incentives of tool inventors to develop new and better research tools. In the long run, the society as a whole would probably not benefit from an extended exception. A broader exception would probably not be considered as a "limited exception" in accordance with Article 30 of the TRIPS Agreement. It would conflict with the normal exploitation of the patent and prejudice the legitimate interests of the patent owner. In this regard, US' broad Bolar exception may not be considered as complying with TRIPS as it extends to uses of information obtained through the use of patented inventions for business purposes, activities beyond the generating of necessary information for the FDA, and other commercial uses except for commercial sales. An overly broad European Bolar exception could also be inconsistent with TRIPS, especially as the status of research tools under the exception can be considered as somewhat unclear, considering the limited and scattered discussions in doctrine and the lack of clarifying case law.

Ways to overcome the access problems for research tools may have been found through "working solutions". This may not be a proper way of handling the issue as certain actors may be excluded from such solutions. Considering alternative solutions, compulsory licensing for inventions important as research tools could be a reasonable option. The society benefits if researchers are able to perform valuable R&D, while the tool inventor is compensated. How such a licensing scheme would be properly formulated is however not the subject of this thesis.

It is difficult to determine the optimal balance between the interest of having new and improved tools and a desired level of innovation through the use of such tools. However, the discussions are based on theoretical assumptions. If empirical studies are performed in the future, for instance in Belgium, it will be interesting to study the results. In addition, even though there has been much complaint regarding the research exception and the "research tool issue" in the US, the US maintains its role as the leading innovation nation in the world.

9 Conclusion

There is a need of clarifying the scope and interpretation of the experimental use exception, both within Europe and in the US. In Europe, where most countries have an experimental use exception exempting research performed on a patented invention, its application to clinical trials varies. Even though Directive 2004/27/EC has provided certain guidance regarding generic products, the question still remains whether clinical trials for new products are covered by the regulatory approval exception or the experimental use exception. Considering the broad approach adopted in the US, it might be favourable for those European countries having a narrow approach towards clinical trials, such as Sweden, to broaden their research exceptions. Even though a broad experimental use exception could be considered as unduly encroaching on the interests of the patent owner since clinical trials have almost purely commercial purposes, a narrow exception could hamper clinical research and put those countries on a competitive disadvantage. In addition, the society as a whole would benefit from an earlier access to new and better products and processes.

As regards research tools, this is a debate which mainly has taken place in the US. Through case law, the regulatory approval exception has been held to cover any patented invention and any research that, if successful, would be included in an FDA submission. Hence, research tool patents may be encompassed since there is no clear distinction between different uses of patented inventions. The current interpretation of the Bolar exception would at least exempt research with substances that are potential drug candidates. In the await for a clarification by the Congress or the courts, it is yet uncertain whether other research tools are exempted and to what extent. Research tools are not generally exempted under the research exceptions in Europe, except from Belgium which has an explicit exception for research performed with patented inventions for scientific purposes. There is nothing indicating that the European Bolar exception would exempt uses of research tool patents in clinical trials. However, some of the Member States' implementation of the Bolar exception has shown that there may be a tendency towards exempting more than just the product being the subject of the market approval application.

According to some studies, the license system generally works well as regards research tool patents. Yet, there are situations where research tool patents may block follow-on research due to high licensing costs or denied licensing. Exempting research tools under the experimental use exception or the Bolar exception does not occur to be a balanced solution because it would deprive the value of all research tools, including those that do not impose any blocking effects. Other, potentially more balanced, solutions are available for addressing the "research tool issue", for instance by considering competition law solutions when licenses for key research tools are denied.

Bibliography

Legal Documents

Agreement Trade-Related Aspects of Intellectual Property Rights (TRIPS) 15 April 1994, available at: http://docsonline.wto.org/

Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions

Directive 2004/27/EC of the European Parliament and of the Council of 31 March 2004 amending Directive 2001/83/EC on the Community Code relating to medicinal products for human use

European Patent Convention (EPC), 13th Edition, 1 July 2007, available at: http://www.epo.org

Proposal for a Council Regulation on the Community Patent, Council Document 7119/04, 8 March 2004

Books

Benyamini, Amiran, *Patent Infringement in the European Community*, IIC Studies, vol. 13, Munich,1993

Domeij, Bengt, *Läkemedelspatent – Patent på läkemedel i Europa ur ett rättsvetenskapligt och rättsekonomiskt perspektiv*, Stockholm, 1998

Domeij, Bengt, *Pharmaceutical Patents in Europe*, Stockholm, 2000

Hellstadius, Åsa, *Gene Technology and the Law – a Guide to Intellectual Property Law and other Legal Aspects of the Use of Gene Technology*, Stockholm, 2002

Articles

Augenstein, Christof, *The Admissibility of Clinical Trials With Respect to the Utilisation of Patented Research Tools*, World Intellectual Property Review, vol. 30, 2007

Bor, Fiona, *Exemptions to Patent Infringement applied to biotechnology research tools*, European Intellectual Property Report, 2006, 28(1) 5-14

Clarke, J., Piccolo, J., Stanton, B., Tyson, K., *Patent Pools: A Solution to the Problem of Access in Biotechnology Patents?* United States Patent and Trademark Office, 2000 (available at:

http://www.uspto.gov/web/offices/pac/dapp/opla/patentpool.pdf)

Cook, Trevor, *A European Perspective as to the Extent to which Experimental Use, and Certain Other, Defences to Patent Infringement, apply to Differing Types of Research*, A report for the Intellectual Property Institute, March 2006.

Cook, Trevor *Responding to the Concerns About the Scope of the Defence From Patent Infringement for Acts Done for Experimental Purposes Relating to the Subject Matter of the Invention*, Intellectual Property Quarterly 2006, 3, 193-222

Cornish, W, *Experimental Use of Patented Inventions*, 29 ILC 735, 1998.

Correa, Carlos M., *The International Dimension of the Research Exception*, January 2005, SIPPI Project. AAAS, available at: http://sippi.aaas.org/Pubs/Correa_International%20Exception.pdf

Dent, Jensen, Waller & Webster, *Research Use of Patented Knowledge: A Review*, OECD Directorate for Science, Technology and Industry (STI), 2006, available at: http://www.oecd.org/sti/working-papers

Ducor, Philippe, *Research Tool Patents and the Experimental Use Exemption – A Non-win Situation?* Nature Biotechnology, Vol. 17, October 1999

Dreyfuss, Rochelle, *Protecting the Public Domain of Science: Has the Time for an Experimental Use Defence Arrived?* 46 Arizona Law Review 457, Fall 2004

Feit, Irving N., *The Safe Harbor Infringement Exemption Under the Hatch-Waxman Act, Finally Defined*, Intellectual Property Today, August 2005, available at: http://www.iptoday.com/pdf/2005/8/Feit_Proof%203.pdf

Freschi, Gina C., *Navigating the Research Exemption's Safe Harbor: Supreme Court to Clarify Scope – Implications for Stem Cell Research in California*, 21 Santa Clara Computer and High Technology Law Journal 855, May 2005

Goddar, Heinz, *Experimental Use Exception – The European Perspective*, Patent World, September 2001

Heller & Eisenberg, *Can patents deter innovation? The Anticommons in Biomedical Research*, Science, New Series, vol. 280, No. 5364, May 1998

Helm, Katherine A., *Outsourcing the Fire of Genius: The Effects of Patent Infringement Jurisprudence on Pharmaceutical Drug Development*, 17 Fordham IP, Media & Entertainment Law Journal 153, 2006.

Holzapfel, Henrik & Sarnoff, Joshua D., *A Cross-Atlantic Dialog on Experimental Use and Research Tools*, Draft August 2007, available at: The Social Science Research Network Electronic Paper Collection http://ssrn.com/abstract=1005269

Iles, Kevin, *A Comparative Analysis of the Impact of Experimental Use Exemptions in Patent Law on Incentives to Innovate*, 4 Northwestern Journal of Technology & Intellectual Property 61, Fall 2005

Lewis, Jeffrey I D, Mandrgoc, Melissa & Salinas-Stern, Ian, *Are Safe Harbors for Research Tool Patents Still at Sea?*, The IP Litigator: Devoted to Intellectual Property Litigation and Enforcement, 14, 1, Jan/Feb 2008

Mireles, Michael S., *Adoption of the Bayh-Dole Act in Developed Countries: Added Pressure for a Broad Research Exemption in the United States?* 59 Maine Law Review 259, 2007

Mueller, Janice M, *No "Dilettante Affair": Rethinking the Experimental Use Exception to Patent Infringement for Biomedical Research Tools*, 76 Washington Law Review 1, 2001

Mueller, Janice M, *The Evanescent Experimental Use Exemption from United States Patent Infringement Liability: Implications for University and Nonprofit Research and Development*, 56 Baylor Law Review 917, 2004

O'Rourke, Maureen A., *Toward a Doctrine of Fair Use in Patent Law*, 100 Columbia Law Review 1177, June 2000

Overwalle, Geertrui van& Zimmeren, Esther van, *Reshaping Belgian Patent Law: The Revision of the Research Exemption and the Introduction of a Compulsory License for Public Health*, Centre for Intellectual Property Rights, University of Leuven, Belgium, Chizaiken Forum vol. 64, Winter 2006, available at: http://www.iip.or.jp/e/forum/index.html

Patel, Vihar R., *Are Patented Research Tools Still Valuable? Use, Intent, and a Rebuttable Presumption: A Proposed Modification for Analyzing the Exemption from Patent Infringement Under 35 U.S.C. § 271 (e)(1)*, 47 The Intellectual Property Law Review 407, 2007.

Pfaff, Esther, "*Bolar" Exemptions – A Threat to the Research Tool Industry in the U.S. and the EU?* International Review of Intellectual Property and Competition Law, ILC, 2007.

Roox, Kristof, *The Bolar Provision: A Safe Harbour in Europe for Biosimilars*, EURAlex issue 172, 2006, p. 19, available at: http://www.crowell.com/documents/DOCASSOCFKTYPE_ARTICLES_614,pdf

Shapiro, Carl, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, 2001, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=273550

Strandburg, Katherine J., *What Does the Public Get? Experimental Use and the Patent Bargain*, Wisconsin Law Review 81, 2004

Strandburg, Katherine J., *Users as Innovators: Implications for Patent Doctrine*, Social Sciences Research Network (SSRN), March 2007, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=969399

Thai, Wendy, *Toward Facilitating Access to Patented Research Tools*, 6 Minnesota Journal of Law, Science and Technology 373, December 2004

Thomas, Kimberly M., *Protecting Academic and Non-Profit Research: Creating a Compulsory Licensing Provision in the Absence of an Experimental Use Exception*, Santa Clara Computer and High Technology Law Journal, 23, 2, January 2007, p. 347.

Walsh, John P, Arora, Ashish & Cohen, Wesley M., *Effects of Research Tool Patents and Licensing on Biomedical Innovation*, 2003, available at: http://www.nap.edu/openbook.php?isbn=0309086361&page=285

Warburg, Richard J. and Maebus, Stephen B., *Warning – Research Dollars at Risk!*, Legal Times, March 24, 2003 (available at: http://www.foley.com/files/tbl_s31Publications/FileUpload137/ 1300/2003-24-03.pdf)

Westerlund, Li, *Blocking effects? Research tool patents and the "safe harbour" exemption*, Patent World 174, July/August 2005

Wiegel, Paul, *Was the FDA Exemption to Patent Infringement, 35 U.S.C. § 271(e)(1), Intended to Exempt a Pharmaceutical Manufacturer's Activities in the Development of New Drugs?* Boston College Intellectual Property & Technology Forum 112901, November 2007.

Reports

Draft Report to the European Commission (DG Research), *Monitoring and Analysis of technology transfer and intellectual property regimes and their use*, DLA Piper and Mason Hayes+Curran, September 2007, available at: http://www.eutechnologytransfer.eu/deliverables/experimental_use_exemption.pdf

OECD Report, *Genetic Inventions, Intellectual Property Rights and Licensing Practices, Evidence and Policies*, 2002, available at: http://www.oecd.org/dataoecd/42/21/2491084.pdf

OECD Summary Report from the Conference on Research Use of Patented Inventions, arranged by CSIC/OECD/OEPM, Madrid, 18-19 May 2006, available at: http://www.oecd.org/dataoecd/21/38/37868230.pdf

Report of the National Institutes of Health (NIH) Working Group on Research Tools, June 4, 1998,
available at: http://www.nih.gov/news/researchtools/index.htm#recom

SOU 2008:20, *Patentskydd för biotekniska uppfinningar*, Stockholm 2008

WHO Report, *Public health, innovation and intellectual property rights*, Report of the Commission on Intellectual Property Rights, Innovation and Public Health, World Health Organisation, 2006,
available at: http://www.who.int/intellectualproperty/en/

Other resources
All information below was accessible in April 2008.

Eisenberg, *Patented Research Tools and the Law*, National Research Council, Intellectual Property Rights and Research Tools in Molecular Biology, Summary of a Workshop Held at the National Academy of Sciences, February 15-16, 1996, available at: http://www.nap.edu/readingroom/books/property/

HUGO Intellectual Property Committee, *Statement on the Scope of Gene Patents Research Exemption, and Licensing of Patented Gene Sequences for Diagnostics*, December 2003.
Available at: http://www.hugointernational.org/PDFs/Statement%20on%20the%20Scope%20of%20Gene%20Patents,%20Research%20Exemption.pdf

Life Science Update, Bird & Bird Newsletter, October 2005, available at: http://www.twobirds.com/english/publications/newsletters/display_results.cfm?newsletter=28090.

OECD Policy Brief, *Intellectual Property and Competition Policy in the Biotechnology Industry*, June 2005, available at: http://www.oecd.org/dataoecd/36/4/35040373.pdf

UK Intellectual Property Office, *The Bolar Exemption - activities covered by the exemption*, available at: http://www.ipo.gov.uk/policy/policy-issues/policy-issues-patents/policy-issues-patents-pharmaceutical/policy-issues-patents-pharmaceutical-activities.htm

United States Court of Appeals for the Federal Circuit, http://www.cafc.uscourts.gov/index.html

Table of Cases

WTO

Canada – Patent protection of Pharmaceutical Products, Report by the WTO Dispute Settlement Panel, 17 March 2000, WT/DS114/R.

European cases

France: *Wellcome Foundation v Parexel International & Flamel & Créapharm*, Tribunal de Grande Instance de Paris, 20 February 2001 (PIBD 2001, 729, III-530)

Germany: *Klinishe Versuche II*, [1998] RPC 423 (BGH (Ger))
Klinishe Versuche I, [1997] RPC 623 (BGH (Ger))

Netherlands: *Pharbita and Medicopharma v. Imperial Chemical Industries PLC* (1992, Dutch Hoge Raad)
Kirin Amgen v. Boehringer Mannheim (1995, Dutch Hoge Raad)
Applied Research Sys. ARS Holding NV v Organon Intl. BV (1995, Dutch Hoge Raad)
SmithKline French Laboratories Ltd. v. Generics VB, (1997 Dutch Hoge Raad)

Sweden: Stockholm City Court, T 7-536-93, 1995-06-05

UK: *Monsanto Co. v. Stauffer Chemicals Co*., [1985] RPC 515 (UK Court of Appeal)
Smith Kline & French Laboratories Ltd. v. Evans Medical Ltd, [1989] FSR 513 (UK Patents Court)

US cases

Whittemore v. Cutter, 29 F. Cas. 1120 (No. 17,600) (C.C.D.Mass.1813)
Sawin v. Guild, 21 F. Cas. 554, 555 (1813)
Roche Products Inc. v. Bolar Pharmaceutical Co. Inc., 733 F.2d 858 (Fed. Cir. 1984)
Scripps v. Genentech, 666 F.Supp. 1379 (N. D. Cal 1987)
Infigen v. Advanced Cell Technology, Inc., 65 F.Supp. 2d 967 (W. D. Wisc 1989)
Intermedics, Inc. v. Ventritex Co., Inc., 775 F.Supp. 1269 (N.D.Cal. 1991)
Eli Lilly & Co v. Medtronic, Inc., 496 U.S. 661, 110 S.Ct. 2683 (1990)
Telectronics Pacing Systems, Inc., v. Ventritex, Inc., 982 F.2d 1520 (C.A. Fed 1992)
Bio-Technology General Corp. v. Genentech Inc., 80 F.3d 1553 (Fed. Cir. 1996)

Embrex Inc. v. Service Engineering Corporation, 216 F.3d 1343 (Fed. Cir. 2000)
Bristol-Myers Squibb Co. v. Rhine-Poulenc Rorer, Inc., F.Supp. 2d, 2001 WL 1512597 (S.D.N.Y. Nov. 28, 2001)
Bayer AG v. Housey Pharmaceuticals, Inc., 228 F.Supp.2d 467 (D.Del. 2002)
John M. J. Madey v. Duke University, 307 F.3d 1351 (Fed. Cir. 2002).
Nexell Therapeutics, Inc. v. Amcell Corporation, 199 F.Supp.2d 197 (D.De. 2002)
Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193 (2005)
Third Wave Technologies, Inc., v. Stratagene Corporation, 381 F.Supp.2d 891 (D. Wis. 2005)
Classen Immunotherapies, Inc. v. King Pharmaceuticals, Inc., 466 F.Supp.2d 621, (D. Md. 2006)
Benitec Australia, Ltd., v. Nucleonics, Inc., 495 F.3d 1340 (Fed. Cir. 2007)
Amgen, Inc., v. International Trade Commission (ITC), (Fed. Cir. March 19, 2008)