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When Is Early-Stage Research Patentable?

Caselaw makes clear that for pharma and biotech discoveries, the utility requirement remains a hurdle.

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PHARMACEUTICAL science and, more recently, biotechnology, produce discoveries in the realm of basic science whose ultimate utility as therapeutic treatments can be difficult to predict. The Supreme Court, in 1966, established the basic principles for determining when a scientific discovery is sufficiently useful to merit being patentable.

Although the standard is not high, and is easily satisfied for most inventions, early stage pharma and biotech research can present borderline cases of patentability. As a result, the courts have developed an entire body of law during the past four decades seeking to draw the line between unpatentable basic research and discoveries that show sufficient promise of practical benefit to support patentability.

Most recently, the Federal Circuit refused to permit patenting fragments of a particular gene of unknown properties because its only use was as a tool for further research directed towards that gene.[1] Reviewing this body of law, including the most recent developments, demonstrates that the utility requirement remains a hurdle for patentability of potential pharma and biotech inventions, if not for most other technologies.

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The Utility Requirement

Utility is one of the most basic requirements for patentability.[2] Congress set forth the requirement that an invention be useful in order to be patentable in §101 of the Patent Act.[3]

The Supreme Court, in *Brenner v. Manson*, explained that "[t]he basic quid pro quo…for granting a patent monopoly is the benefit derived by the public from an invention" that complies with this utility requirement.[4] The Court held that §101 requires that a process does not possess sufficient utility until it "is refined and developed to this point—where specific benefit exists in currently available form."[5]

The *Brenner* decision not only established a general standard for utility, it did so in the context of a dispute involving a patent application for a pharmaceutical compound.

The fundamental principles of patent law apply uniformly to a wide variety of technologies. Certain technologies, however, such as pharmaceutical science and biotechnology, raise unique issues because of their ability to generate discoveries that may be far removed from a practical benefit to humanity.

The *Brenner* decision, and its progeny, is one example of this phenomenon. This body of law is reflected in "Special Considerations for Asserted Therapeutic or Pharmacological Utilities" in the PTO's Manual for Patent Examination Practices.[6]

The Court found a process for making a steroid compound with no known use failed to satisfy the utility requirement. The applicant argued that the claimed process satisfied the utility requirement "because it works—i.e., produces the intended product."[7]

The Court rejected this argument. It also rejected the applicant's argument for utility "because the compound yielded belongs to a class of compounds now the subject of serious scientific investigation."[8] Finally, the fact that a homologous compound had utility did not persuade the Court because of the recognized unpredictability in the steroid field.[9]

Intending to establish a broad precedent, the Court stated that its reasoning was not limited to process claims and "would apply

equally to the patenting of the product produced by the process."[10] *Brenner* thus laid the foundation for a body of law applying the utility requirement to pharmaceutical inventions.

Motivating Policy

Brenner explained the policy behind its holding. The utility requirement guards against overly broad or imprecisely defined claims:

> [A] process patent in the chemical field, which has not been developed and pointed to the degree of *specific utility*, creates a monopoly of knowledge which should be granted only if clearly commanded by the statute. Until the process claim has been reduced to production of a product shown to be useful, the metes and bounds of that monopoly are not capable of precise delineation. It may engross a vast, unknown, and perhaps unknowable area. Such a patent may confer power to block off whole areas of scientific development, without compensating benefit to the public.[11]

The utility requirement also protects the public from patents that fail to disclose and confer on it a specific and substantial utility:

> The basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility. Unless and until a process is refined and developed to this point—where specific benefit exists in currently available form—there is insufficient justification for permitting an applicant to engross what may prove to be a broad field.[12]

'Brenner' Progeny

The utility requirement, even for pharma and biotech inventions, is generally not difficult to satisfy.

"[T]he threshold of utility is not high: [a]n invention is 'useful' under section 101 if it is capable of providing some identifiable benefit."[13] An invention need only meet "one stated objective."[14]

Utility will not be negated by "[t]he fact that an invention has only limited utility and is only operable in certain applications."[15] Nonetheless, the demonstrated utility must be commensurate with the scope of the claims. A few years after *Brenner*, a court found that "evidence limited to one compound and two types of cancer" was not commensurate with the scope of a claim for "treating seven types of cancer with several compounds."[16]

Applicants seeking EST claims, or claims involving other cutting edge biotechnologies, need to consider amassing test data and other evidence of practical benefits to guard against utility rejections.

Historically, the utility requirement has only been meaningfully applied in proceedings before the PTO. Once a patent has been issued, it cannot easily be challenged for lack of utility. After the Patent Office issues a patent, courts rarely invalidate based on lack of utility.

A "correct finding of infringement of otherwise valid claims" during infringement litigation, according to the Federal Circuit, "mandates as a matter of law a finding of utility under §101."[17] Thus, "[i]f a party has made, sold, or used a properly claimed device, and has thus infringed, proof of that device's utility is thereby established. People rarely, if ever, appropriate useless inventions."[18]

Accordingly, any discussion of utility should focus on what the Patent Office does.

Even the PTO faces serious difficulties rejecting claims for lack of utility. It must accept assertions of utility as true "unless there is reason to doubt the objective truth of the statements in the specification."[19] "From this it follows that the PTO has the initial burden of challenging a presumptively correct assertion of utility in the disclosure."[20]

The burden shifts "to the applicant to provide rebuttal evidence sufficient to convince [the skilled artisan] of the invention's asserted utility."[21] Rebutal declarations can be used to substantiate an assertion of utility "already in the specification."[22]

Despite hurdles the PTO must overcome in rejecting claims for lack of utility, it does reject some claims for potential drug therapies. The law governing the utility standard for pharmaceutical inventions has its origin in the *Brenner* requirement that a patent disclose a "specific utility."[23] This is a "threshold requirement[]."[24] That a compound is one of many currently "the subject of serious scientific study" does not suffice.[25] Merely reciting "biological activity" is "too nebulous."[26]

On the other hand, evidence that claimed compounds worked in tumor models that "represent actual specific lymphocytic tumors" satisfied the utility requirement.[27] Utility can be based on properties of the claimed compound or compound produced from a claimed process.[28] It can also be based on the final compound derived from a claimed intermediate if the final compound is itself useful.[29]

Disclosing a therapeutic use for a claimed compound is not the only way to satisfy the utility requirement. The Court of Customs and Patent Appeals, the predecessor to the Federal Circuit, held in *Nelson v. Bowler* that disclosure of specific pharmacological activities satisfies the utility requirement even without disclosing a specific therapeutic use.[30]

The Patent Office had rejected the asserted utilities for a chemical compound based on its ability to affect blood pressure in rats and its ability to relax smooth muscle cells in vitro. The court reversed because "the board erred in not recognizing that tests evidencing pharmacological activity may manifest a practical utility even though they may not establish a specific therapeutic use."[31] Thus, "specific pharmacological activities, i.e., smooth muscle stimulation and blood pressure modulation, were recognized as practical utilities" because "a correlation between test results and pharmacological activities has been established."[32]

The court justified its decision as sound policy: "It is inherently faster and easier to combat illnesses and alleviate symptoms when the medical profession is armed with an arsenal of chemicals having known pharmacological activities. Since it is crucial to provide researchers with an incentive to disclose pharmacological activities in as many compounds as possible, we conclude that adequate proof of any

such activity constitutes a showing of practical utility."

Five years later, the Federal Circuit held, in *Cross v. Iizuka*, that disclosing the fact that a compound inhibits "thromboxane synthetase in vitro" satisfied the utility requirement.[33] In vitro testing, the court explained,[34] can be "the final link in the screening chain" that "may lead eventually to the use of the drug as a therapeutic agent in humans."[35]

Again the court explained the benefit of its upholding patentability in terms of promoting further research: The data from in vitro testing can serve to "marshal resources and direct the expenditure of effort to further in vivo testing of the most potent compounds, thereby providing an immediate benefit to the public."

Gene Fragments: 'Fisher'

Last year, the Federal Circuit, in *In re Fisher*, applied four decades of pharmaceutical utility law to a biotech patent application attempting to claim certain gene fragments from corn. The reasoning of *Brenner* and its progeny, the court stated, "applies with equal force in the fields of chemistry and biology."[36]

Fisher attempted to claim five nucleotide sequences, also known as expressed sequence tags (ESTs), that encoded proteins or protein fragments in the maize plant.

Fisher did not know the function of any of the genes associated with his claimed sequences. Nevertheless, Fisher offered seven ways to use the claimed ESTs, including as a marker to map the entire maize genome or genomes of other plants, to measure or control gene expression, to make copies of the associated corn genes, and to identify genetic differences among corn plants. The court found these potential uses insufficient.

"Essentially, the claimed ESTs act as no more than research intermediates that may help scientists isolate the particular underlying protein-encoding genes and conduct further experimentation on those genes."[37] *Cross* previously stated that both in vitro and in vivo testing, which it described as the "first link" and "intermediate link" in the research chain leading to new drugs, can establish utility.[38]

The *Fisher* court distinguished *Cross*, along with *Nelson* and *Jolles*. The applicants in those cases "disclosed specific pharmaceutical uses in humans…and supported those cases with specific animal test data."[39] The *Fisher* court was not prepared to accept applicants' assertions of utility without evidence.

Fisher "failed to present any evidence—test data, declaration, [or] deposition testimony."[40] Nor did Fisher "present any evidence showing that agricultural companies have any interest in the claimed ESTs."[41] Unlike some prior decisions, such as *Cross* and *Nelson*, the *Fisher* court grounded its decision solely in the facts and lack of evidence, and rejected the government's invitation to affirm the PTO based on reasons of public policy.

The *Fisher* court extended the law of pharmaceutical utility to biotechnology. In doing so, it has continued the practice, dating back to *Brenner*, of scrutinizing assertions of utility based on early stage pharmaceutical research. Nevertheless, the door remains open for patenting ESTs, provided the applicant is able to make a sufficient evidentiary showing.

The link between in vitro and in vivo data, and finding effective drug therapies is better understood by the courts today than the link between ESTs and effective diagnostic tools or therapies. Perhaps if that can be demonstrated, the PTO and the courts may become more receptive to EST claims. In the meantime, applicants seeking EST claims, or claims involving other cutting edge biotechnologies, need to consider amassing test data and other evidence of practical benefits to guard against utility rejections.

1. *In re Fisher*, 421 F.3d 1365 (Fed. Cir. 2005).
2. *Fujisawa v. Wattanasin*, 93 F.3d 1559, 1563 (Fed. Cir. 1996) ("For over 200 years, the concept of utility has occupied a central role in our patent system.").
3. 35 U.S.C. §101 ("Whoever invents or discovers any[thing] new and useful,…may obtain a patent therefore.")
4. *Brenner v. Manson*, 383 U.S 519, 534 (1966).
5. 383 U.S. at 534.
6. M.P.E.P. §2107.03
7. 383 U.S. at 532.
8. 383 U.S. at 532.
9. Id.
10. Id. at 535.
11. Id. at 534-35 (emphasis added).
12. Id. at 534-35.
13. *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571 (Fed. Cir. 1992) ("To violate §101 the claimed device must be totally incapable of achieving a useful result…")
14. *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 958 (Fed. Cir. 1983).
15. *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 762 (Fed. Cir. 1984).
16. *In re Buting*, 418 F.2d 540, 544 (C.C.P.A. 1969).
17. *Raytheon*, 724 F.2d at 959; *Tol-o-matic Inc. v. Proma Produktund Marketing Gesellshaft*, 945 F.2d 1546, 1553 (Fed. Cir. 1991).
18. 724 F.2d at 959.
19. *In re Marzocchi*, 439 F.2d 220, 223 (C.C.P.A. 1971).
20. *In re Brana*, 51 F.3d 1560, 1568 (Fed. Cir. 1995).
21. Id.
22. Id.
23. *Brenner*, 383 U.S. at 536.
24. *Cross v. Iizuka*, 753 F.2d 1040, 1051-52 (Fed. Cir. 1985).
25. 383 U.S. at 532; *Fisher*, 421 F.3d at 1374 ("claiming five particular ESTs which are capable of hybridizing with underlying genes of unknown function found in the maize genome" fail to satisfy utility requirement).
26. *In re Kirk*, 376 F.2d 936, 941 (C.C.P.A. 1967); see also *In re Diedrich*, 318 F.2d 946, 949 (C.C.P.A. 1963).
27. *Brana*, 51 F.3d at 1565.
28. For example, compare *Brenner v. Manson*, 383 U.S. 519 (1966) with *Cross v. Iizuka*, 753 F.2d 1040, 1051-52 (Fed. Cir. 1985).
29. See, e.g., *In re Kirk*, 376 F.2d 936, 945 (C.C.P.A. 1967) ("if a process for producing a product of only conjectural use is not itself 'useful' within §101, it cannot be said that the starting materials for such a process—i.e., the presently claimed intermediates are 'useful'"); *In re Joly*, 376 F.2d 906 (C.C.P.A. 1967); see also *Fisher*, 421 F.3d at 1375 ("Just as the claimed compounds in *Kirk* and *Joly* were useful only as intermediates in the synthesis of other compounds of unknown use, the claimed ESTs can only be used as research intermediates in the identification of underlying protein-encoding genes of unknown function.").
30. *Nelson v. Bowler*, 626 F.2d 853 (C.C.P.A. 1980).
31. Id. at 857.
32. Id. at 857-58.
33. *Cross*, 753 F.2d at 1048.
34. *Cross*, 753 F.2d at 1050.
35. Id.
36. *Fisher*, 421 F.3d at 1376.
37. Id. at 1373.
38. *Cross*, 753 F.2d at 1050.
39. *Fisher*, 421 F.3d at 1377.
40. Id.
41. Id.