No. 04-1465
(Serial No. 09/619,643)

IN THE

# UNITED STATES COURT OF APPEALS

FOR THE FEDERAL CIRCUIT

*IN RE* DANE K. FISHER AND RAGHUNATH V. LALGUDI

**Appeal from the United States Patent and Trademark Office**
**Board of Patent Appeals and Interferences**
**Appeal No. 2002-2046**
**Application No. 09/619,643**

## BRIEF FOR *AMICI CURIAE*

ELI LILLY AND COMPANY, ASSOCIATION OF AMERICAN MEDICAL COLLEGES, BAXTER HEALTHCARE CORPORATION, NATIONAL ACADEMY OF SCIENCES, DOW AGROSCIENCES LLC, AND AMERICAN COLLEGE OF MEDICAL GENETICS IN SUPPORT OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN SUPPORT OF AFFIRMANCE


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**December 14, 2004**

FORM 9. Certificate of Interest

# UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

In re Dane K. Fisher and Raghunath V. Lalgudi

No. 04-1465

## CERTIFICATE OF INTEREST

Counsel for the (petitioner) (appellant) (respondent) (appellee) (amicus) (name of party) amicus certifies the following (use "None" if applicable; use extra sheets if necessary):

1. The full name of every party or amicus represented by me is:

Eli Lilly and Company.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

Eli Lilly and Company.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

Eli Lilly and Company.

4. ☐ There is no such corporation as listed in paragraph 3.

5. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

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FORM 9. Certificate of Interest

## UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

In re Dane K. Fisher and Raghunath V. Lalgudi

No. 04-1465

## CERTIFICATE OF INTEREST

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None.

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FORM 9. Certificate of Interest

# UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

In re Dane K. Fisher and Raghunath V. Lalgudi

No. 04-1465

## CERTIFICATE OF INTEREST

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Baxter Healthcare Corporation.

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4. ☐ There is no such corporation as listed in paragraph 3.

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12-10-2004
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FORM 9. Certificate of Interest

# UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

In re Dane K. Fisher and Raghunath V. Lalgudi

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National Academy of Sciences.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

National Academy of Sciences.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

None.

4. ☑ There is no such corporation as listed in paragraph 3.

5. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

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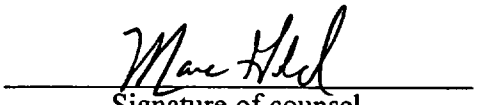
12/09/04
Date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Printed name of counsel

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No. 04-1465

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Counsel for the (petitioner) (appellant) (respondent) (appellee) (amicus) (name of party) amicus certifies the following (use "None" if applicable; use extra sheets if necessary):

1. The full name of every party or amicus represented by me is:

Dow AgroSciences LLC.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

Dow AgroSciences LLC.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

The Dow Chemical Company, Centen Ag Inc., Rofan Services Inc., and Mycogen Corporation.

4. ☐ There is no such corporation as listed in paragraph 3.

5. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

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12/9/2004
Date

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Signature of counsel

Donald R. Stuart
Printed name of counsel

FORM 9. Certificate of Interest.

# UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

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Counsel for the (petitioner) (appellant) (respondent) (appellee) (amicus) (name of party) amicus certifies the following (use "None" if applicable; use extra sheets if necessary):

1. The full name of every party or amicus represented by me is:

American College of Medical Genetics.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

American College of Medical Genetics.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

None.

4. ☑ There is no such corporation as listed in paragraph 3.

5. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

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12/10/04
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Signature of counsel

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Printed name of counsel

## TABLE OF CONTENTS

## TABLE OF AUTHORITIES

### Cases

**Statutes**



**Other Authorities**

## I. STATEMENT OF INTEREST OF *AMICI CURIAE*

Eli Lilly and Company, the Association of American Medical Colleges, Baxter Healthcare Corporation, the National Academy of Sciences, Dow AgroSciences LLC, and the American College of Medical Genetics ("*Amici*") are entities having common interest that fundamental research, which is essential for their constituents, customers, and/or the public to realize benefits derived from the study of plant, animal, and human genomes, not be deterred or delayed by improperly granted EST patents. If patents merely disclose ESTs, but make no actual contribution toward understanding the biological significance of any proteins associated with the ESTs, then scientists may not feel free to undertake the arduous research required to determine the proteins' biological significances. Without knowing the biological significance, the additional research necessary to translate such knowledge into improved plants, agricultural chemicals, medical treatments, diagnostics, and drugs useful to the public will be delayed or not undertaken.

*Amici* submit this brief to persuade the Court not to allow patents that are incommensurate with the patentee's contribution to the art—patents that will inhibit research and development. Moreover, *Amici* submit this brief

because granting claims like the appealed claim would be inconsistent with prior Federal Circuit and Supreme Court decisions.

*Amici* have no stake in the result of this appeal. The parties have not contributed to the preparation of this *amicus* brief. The parties (Monsanto and the Solicitor) have consented to the filing of this *amicus* brief.

## II. INTRODUCTION

This appeal is significant because it will determine whether nucleic acids can be validly patented if the inventor discloses nothing about the identity or utility of the protein(s) encoded by the nucleic acids.

Fisher claims:

> A substantially purified nucleic acid molecule that encodes a maize protein or fragment thereof comprising a nucleic acid sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:5.

Blue Brief at 12. SEQ ID NOs:1-5, called expressed sequence tags ("ESTs"), represent the nucleic acid sequences of small portions of a number of undescribed complementary DNA ("cDNA") molecules randomly selected from a large "library." A0003.[1]

Despite the claim language, Fisher fashions its arguments around "the

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[1] Citations to the parties' Joint Appendix are noted as A___.

claimed ESTs" (Blue Brief at 12), a distorting shorthand that diverts attention from the "claimed invention," the proper object of analysis. Indeed, the five ESTs themselves (SEQ ID NOs:1-5) may not even be within the scope of the claim because they might not include any translated nucleotides, thereby failing to encode a maize protein or fragment thereof. Fisher does not demonstrate that its five specific ESTs encode anything. Thus, *Amici* will refer to the "claimed invention."

The sequence, function, and "agronomic significance"—*i.e.*, real-world usefulness to the public (*see* A0038, A0057-59)—of the maize proteins encoded by the *claimed invention* were unknown when filed. On appeal, Fisher argues that utility exists, despite not knowing the sequences, functions, or agronomic significance of the *encoded proteins*, because the ESTs might be considered for various alleged research purposes.

*Amici* ask this Court to find that Fisher's claimed invention fails to meet the utility, written description, and enablement requirements. The claimed invention lacks utility because each potential research purpose asserted by Fisher is merely "a hunting license." Fisher fails the written description requirement because the claimed invention is not defined by adequate structure, formula, chemical name, or physical properties, or by a known or disclosed structure-function relationship. Finally, enablement is

lacking, not only because the claim lacks utility, but also because determining which, if any, of the species are operable and useful would require undue experimentation.

## III. ARGUMENT

### A. EST Patenting Will Discourage Research.

Fisher seeks a patent covering an "invention" not yet complete or sufficiently definite to be adequately described, nor explored enough to provide specific benefit in currently available form. Fisher seeks a patent that would deter every other scientist from investigating *any* use of a large number of genetic sequences—none of which Fisher has discovered or adequately described, and which provide only a partial sequence, at best, for unidentified proteins having unspecified uses. Fisher fails to identify any use for these sequences, other than speculative research. In short, Fisher seeks to preempt other scientists from entire fields of research.

Those who, like Fisher, would seek to patent nucleic acids comprising ESTs without real knowledge of the claimed invention's utility are staking claims based upon no real knowledge of their discovery. But such claims, if granted, could be used to prevent, threaten to prevent, or extract value from everything that might later be discovered about genes and proteins associated with genetic sequences. They are, in effect, laying claim to a

function or use that does not yet exist in currently available form, and posing a threat to those who would, but for the patent, discover the function or use.

The Supreme Court has recognized that such claims stifle, rather than promote, innovation. In *Holland Furniture Co. v. Perkins Glue Co.*, 277 U.S. 245, 257 (1928), the Court stated,

> A claim so broad, if allowed, would operate to enable the inventor who has discovered that a defined type of starch answers the required purpose to exclude others from all other types of starch and so foreclose efforts to discover other and better types. The patent monopoly would thus be extended beyond the discovery and would discourage rather than promote invention.

Similarly, the Court in *O'Reilly v. Morse,* 56 U.S. 62, 113 (1853), observed: "[Morse] claims an exclusive right to use a manner and process which he has not described and indeed had not invented, and therefore could not describe when he obtained his patent. The court is of [the] opinion that the claim is too broad, and not warranted by law."

U.S. Supreme Court Justice Stephen Breyer, at the March 2000 Whitehead Policy Symposium on genes and society, observed that

> [the] job [of the patent law] is developing financial incentives that, as they operate in the marketplace, will encourage useful discovery and disclosure without unduly restricting the dissemination of those discoveries, hindering the circulation of important scientific ideas, or

> scattering ownership to the point where it inhibits the use of the underlying genetic advance.

Associate Justice Stephen G. Breyer, *Genetic Advances and Legal Institutions*, 28 J.L., Med., & Ethics 23 (2000). Because no useful discovery, disclosure, or social benefit has yet occurred, issuing a claim like Fisher's would unduly hinder circulation of important scientific ideas and would likely scatter ownership, inhibiting the use of any potential underlying genetic advance.

This Court, too, has identified the underlying policy problem with patenting research plans, such as those proposed by Fisher.

> The difficulty that would arise if we were to hold that a conception occurs when one has only the idea of a compound, defining it by its hoped-for function, is that would-be inventors would file patent applications before they had made their inventions and before they could describe them. That is not consistent with the statute or the policy behind the statute, which is to promote disclosure of inventions, *not of research plans*.

*Fiers v. Revel,* 984 F.2d 1164, 1169 (Fed. Cir. 1993) (emphasis added).

If applications like Fisher's were allowed, further research would be discouraged rather than promoted, delaying discovery and development of innovative products, thwarting progress in the "useful Arts" as well as "Science." U.S. Const. art. 1, sec. 8, cl. 8. The right to exclude should only be awarded when an applicant has disclosed specific and substantial utility

for the claimed invention, adequately described it, and enabled it to be made and used across its entire claimed scope.

It is critical that research scientists and clinicians both have and believe they have freedom to use nucleic acids whose function and biological relevance remain unknown. Constraints on research that would result from the issuance of patents like Fisher's would inhibit vast opportunities in "downstream" research. Unless otherwise exempted, vital, fundamental research could be impaired. *See, e.g., Integra LifeSciences I, Ltd. v. Merck KGaA*, 331 F.3d 860 (Fed. Cir. 2003) (Newman, J., dissenting)

Additionally, allowing claims like Fisher's will give rise to multiple patents covering nucleic acids encoding the same protein. Each patent would disclose a novel EST, but the claims would read on the naturally-occurring nucleic acid encoding the protein. Red Brief at 45-46. Under this Court's precedent, an interference may not remedy the overlapping patents.[2] This will further inhibit research. *See, e.g.*, Nat'l Res. Council, *A Patent System for the 21st Century: Report of the Committee on Intellectual Property Rights in the Knowledge-Based Economy* 70-73 (2004).

Warning of the consequences of awarding a patent before the claimed

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[2] *See Eli Lilly & Co. v. Bd. of Regents of Univ. of Wash.*, 334 F.3d 1264 (Fed. Cir. 2003).

invention has been shown to be useful, the Supreme Court in *Brenner v. Manson* stated that such a patent "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." 383 U.S. 519, 534 (1966) (citation omitted). This Court should heed *Brenner*'s caution against awarding patents too early in research, as in Fisher's case—before the invention can be adequately described and a substantial and specific utility disclosed. *Id.* at 534-35.

### B. The Board Correctly Found that the Claimed Invention Lacks Utility.

This Court should affirm the Board's holding that Fisher's application fails to meet the utility requirement of 35 U.S.C. § 101. The Board correctly rejected Claim 1 because it lacks "substantial utility"; *no* "specific benefit exists in currently available form." *Brenner*, 383 U.S. at 534-35. Fisher's specification only discloses objects of "use-testing"—objects upon which scientific research *could* be performed.

#### 1. The Law Requires Substantial Utility.

Under 35 U.S.C. § 101, an invention must be useful to be patentable. In *Brenner*, the Supreme Court interpreted section 101 to mean that a

claimed invention must have substantial utility—specific benefit existing in currently available form. The Court stated:

> 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.

383 U.S. at 534-35 (emphasis added).

The Court also noted that use as an object of scientific research fails to meet the standard of utility justifying a patent ("Congress intended that no patent be granted on a chemical compound whose sole 'utility' consists of its potential role as an object of use-testing") and that *"a patent is not a hunting license*. It is not a reward for the search, but compensation for its successful conclusion." *Id.* at 535-36. Although *Brenner* was directed to a chemical process, a broader application of its holding is plainly evident in *Brenner* itself (*id.* at 535) and in this Court's precedent. *Cross v. Iizuka*, 753 F.2d 1040, 1046 (Fed. Cir. 1985).

Fisher's claimed invention could be no more than an object of scientific research, *viz.*, an object of use-testing. Fisher merely provides a

"laundry list" of research plans, each general and speculative, and none providing a substantial, specific benefit in currently available form.

**2. Fisher's Asserted Research Uses Are Insubstantial.**

Fisher argues that each of the ESTs[3] could be used as research probes to screen a cDNA library for the unique gene sequence corresponding to the ESTs, even without knowing the encoded protein's utility. Blue Brief at 13. Fisher further asserts that information derived from EST probes would be useful for eight specific types of research. *Id.* However, no potential research purpose asserted by Fisher is specific to the claimed invention; rather, each asserted research purpose is simply that—research that *might* lead to discovering whether the claimed invention has utility, and if so, what that utility is. Thus, the claimed invention could be no more than an "object of scientific research;" it provides *no* "specific benefit in currently available form." *Brenner*, 383 U.S. at 534-35. It has no substantial utility.

Research Probes. Fisher asserts that, even without knowing the specific functions of proteins encoded by the claimed nucleic acids, each of the five ESTs could be used to screen a cDNA library, to discover nucleic

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[3] *Amici* reiterate that there is no guarantee that any of the five ESTs are within the scope of the claimed invention because they could be completely outside of coding regions. Fisher fails to show whether the five ESTs encode anything.

acids that encode proteins. Blue Brief at 12-13. However, that use is merely a research study: 1) to discover the full-length cDNA, which is part of the claimed invention; 2) to deduce the sequence of the protein having undefined functionality; and 3) ultimately, after an unknown amount of experimentation, to determine whether the gene and protein have *any* agronomic significance.

Fisher's asserted use as a probe is analogous to using an intermediate for deriving a product, except that here the intermediate and product are within the same claim. In *In re Kirk*, 376 F.2d 936 (CCPA 1967), the court held that a compound does not meet the utility requirement if useful only in making other compounds with no known use. *Id.* at 945 ("It is not enough that the specification disclose that the intermediate exists and that it 'works,' reacts, or can be used to produce some intended product of no known use."). As a probe, the claimed invention is the object of scientific research and an intermediate to produce other molecules, having no known substantial utility. General use of the claimed invention as a probe is thus too insubstantial to meet the utility requirement.

Molecular Marker. Fisher argues that, even without knowing the protein's function, an EST has utility because it can be used in mapping a genome. Blue Brief at 9. "[The Board failed to see that] the one data point

which may be provided by using the uncharacterized [EST] molecule . . . as a molecular marker or probe represents a substantial use." A0024.

*Amici* agree that none of Fisher's asserted "uses" as molecular markers or probes are sufficiently certain and substantial to provide the required real-world utility under section 101. Consider just one of Fisher's ESTs, for example, SEQ ID NO:1. Because the "trait" associated with the maize protein encoded by the full-length nucleic acid that includes SEQ ID NO:1 ("PROTEIN:1") is unknown, it would be quite indirect and cumbersome to use the map location of SEQ ID NO:1 for the alleged purposes when other markers, whose "traits" and agronomic significance are known, will almost certainly be used directly for such purposes. Furthermore, use of SEQ ID NO:1 as a molecular marker is not substantial without knowledge of whether SEQ ID NO:1 contains a region of genetic variability such that discernable allelic differences might exist between individual plants.

Fisher's other alleged "mapping" uses: linkage analysis, marker assisted breeding, transgenic crop production, crop monitoring, and diagnostics, also would rely *a priori* on the existence of real-world utility, provided only by first knowing the "agronomic significance" of PROTEIN:1. Simply being able to locate where the EST having SEQ ID

NO:1 hybridizes within the maize genome provides no real-world, specific benefit in presently available form to the public. Without extensive experimentation, use of Fisher's claimed invention for mapping could be of little or no value, even for purposes that are merely scientific, much less for the purposes of section 101. Thus, the claimed invention is, at best, an "object of scientific research" providing *no* "specific benefit in currently available form."

Measuring mRNA Levels. Fisher posits that the value of using its ESTs to measure mRNA would be to "identify the type or source of a particular tissue, or to help evaluate how a plant's cells or tissues respond in a particular setting, such as when the plant is infected with disease or subjected to adverse growing conditions." Blue Brief at 15. The Board concluded,

> [T]he specification provides no guidance that would allow a skilled artisan to use data relating to expression of such a gene in any practical way. . . . As the examiner points out, . . . "the instant claimed nucleic acids appear to require further experimentation on the material itself to determine the function and properties of the claimed nucleic acids."

A0021.

*Amici* agree that Fisher provides too little information to use the claimed invention for these purposes. Obtaining SEQ ID NO:1 from leaf

tissue at anthesis does not mean that SEQ ID NO:1 can actually be used to identify tissue type or responses to the environment. A0021-22. This asserted use would require extensive experimentation and information to provide substantial utility, with no assurance of success. A0021. Thus, Fisher's asserted use, "measuring mRNA," does not change the conclusion that it is, at best, merely an "object of scientific research," providing *no* "specific benefit in currently available form."

Primers. Fisher asserts that the "ESTs can be used to save valuable time and effort needed to generate primers for use in the PCR process . . . thereby allowing scientists to generate large sample populations of the corresponding gene sequences in a rapid and cost-efficient manner." Blue Brief at 17. Notably, Fisher did not assert this utility to the Board.

The specific objective of generating corresponding gene sample populations is to determine the claimed invention's sequence (*i.e.*, one comprising, *e.g.*, SEQ ID NO:1) and to express and study PROTEIN:1. Again, because the claimed invention includes the full-length DNA encoding PROTEIN:1, using the claimed invention to generate primers is a reflexive utility—*i.e.*, a use for studying the utility of the claimed invention. Thus, the claimed invention is merely being used as an "object of scientific

research" on the claimed invention, providing *no* "specific benefit in currently available form."

Polymorphism. Fisher claims that the ESTs also can be utilized as probes to identify the presence or absence of polymorphisms, perhaps enabling one to determine the distribution of parental genetic material, or to relate genetic deviations to particular observable traits to track the trait, or to predict the trait's likelihood in progeny plants. Blue Brief at 17-18. The Board found,

> Without knowing any further information in regard to the gene represented by an EST, as here, detection of the presence or absence of a polymorphism provides the barest information in regard to genetic heritage. . . . In contrast, at the other end of the "utility spectrum" would be information gleaned from detecting the presence or absence of a polymorphism when it is known what effect the gene from which the EST is derived has in the development and/or phenotype of the plant.

A0015.

*Amici* agree that Fisher fails to identify whether any of the genes associated with SEQ ID NOs:1-5 are polymorphic or not, and whether polymorphism or lack thereof would have agronomic significance. Furthermore, relating genetic deviations to traits, tracking and predicting traits, and assessing relationships between traits and markers require knowledge of those deviations, traits, and markers. Fisher provides none of

this required knowledge, which may or may not be obtainable using the claimed invention. A0015. Without extensive additional knowledge and experimentation, the claimed invention is merely an "object of scientific research" concerning the presence or absence of polymorphisms, and its utility entirely speculative, providing *no* "specific benefit in currently available form."

Promoters. Fisher also argues that its ESTs can be used to isolate promoters in specific tissue, including the promoter regulating expression of protein in maize leaf tissue at the time of anthesis. Fisher asserts that exploring maize genome regions near the sequences corresponding to the ESTs will provide additional information to physically map the maize genome. Blue Brief at 19. The Board found that Fisher's specification provides no evidence supporting asserted utilities for isolating promoters, nor any expectation of success in doing so. A0017.

Fisher fails to show any agronomically significant promoters associated with the claimed invention. Gaining additional information for a physical map of the maize genome, while scientifically interesting, provides no immediate specific benefit warranting the grant of patent rights. Such learning would be most relevant for discovering when and why the genes are expressed—*i.e.*, studying the claimed invention. Thus, the asserted use,

"isolating useful promoters," in addition to entailing open-ended experimentation without confidence of success, is ultimately using the claimed invention as an "object of scientific research," whose results are entirely speculative. This use provides *no* "specific benefit in currently available form."

Controlling Expression Levels. Fisher asserts that its ESTs can be used to control the expression levels of protein by a gene, allowing scientists to monitor plant cell behavior under varying protein levels. Blue Brief at 18-19. The Board properly found that Fisher's "specification does not indicate that such a method is feasible when the nucleic acid to be used is uncharacterized as here. Such a use does not provide a specific or substantial benefit in currently available form." A0020.

*Amici* further state that if Fisher's claimed invention could be used for the asserted purpose (which *Amici* doubt), it would be done to ferret out the protein's function and agronomic significance. This asserted use is simply another way that the claimed invention could be used to determine whether or not it has utility, thereby making it merely an "object of scientific research" that provides *no* "specific benefit in currently available form." This is not a substantial utility.

Locating Genetic Molecules of Other Organisms. Fisher alleges that its ESTs can be used to probe genetic libraries for gene sequences of interest found in other organisms, "which may serve as a shortcut to help sequence the full-length gene and determine how the gene functions in maize plants." Blue Brief at 21. The Board properly found that Fisher's "specification does not attribute any property in terms of plant trait or phenotype to any of the [ESTs]. In the absence of such information, using the claimed molecules to isolate other molecules, which themselves lack substantial utility, does not represent a substantial utility." A0016. Although the Board did not cite *Kirk* against this alleged utility, the case is pertinent and supports the Board's conclusion.

Thus, despite all Fisher's arguments regarding utility, none of Fisher's eight proposals for further scientific research provide "specific benefit in currently available form." Thus, none provides substantial utility under section 101. *Brenner*, 383 U.S. at 534-35.

**3. The Claimed Invention Is Nothing Like a Microscope.**

Rather than being a research tool used to study other objects, the claimed invention itself is the object of Fisher's asserted research plans. Such "uses," which are solely directed to discovering further information

about the claimed invention including its utility, cannot be considered substantial utilities in currently available form, as section 101 requires.

The posited research proposals for the claimed invention are thus not akin to a microscope, as Fisher asserts. Blue Brief at 39. Although a novel and unobvious microscope would be patentable subject matter under section 101, Fisher's analogy is simply misplaced. A microscope is not the object of the research; it is not being studied. The properties and real-world utility of the microscope are established. New scientific information derived from the use of the microscope relates solely to objects under examination, rather than relating to the microscope itself.

Conversely, each asserted use for the claimed invention relates more or less directly to identifying the structure, function, and/or "agronomic significance" of the protein-encoding nucleic acid. Until that complete nucleic acid is known, the function of the protein it encodes ascertained, and the protein's real-world usefulness to the public determined, Fisher's asserted uses remain effectively research projects on the claimed invention, directed toward ascertaining the claimed invention's utility. The real-world utility remains speculative, at best, without much more information and work than Fisher's application provides.

**4. Absent Real Agronomic Significance, the Claimed Invention Lacks Substantial Utility.**

Not everything used to generate scientific information is patentable, nor should it be. The Supreme Court has clearly noted that scientific contributions are not necessarily patentable subject matter:

> This is not to say that we mean to disparage the importance of contributions to the fund of scientific information short of invention of something "useful," or that we are blind to the prospect that what now seems without "use" may tomorrow command the grateful attention of the public.

*Brenner*, 383 U.S. at 535-36. An EST is merely the first step in a journey of unforeseeable length with no guarantee that anything useful will be discovered in the end. That an EST may facilitate downstream research does not necessarily make it useful; it is merely a starting point.

The research purposes that Fisher recites for its claimed invention do not provide specific and substantial benefit, even if all corresponding genes have a "knowable" function with agronomic significance. *See Kirk*, 376 F.2d at 942 (describing the possibility of determining biological uses of claimed compounds:

> [T]he sum and substance . . . appears to be that one of ordinary skill in the art would know "how to use" the compounds to find out in the first instance whether the compounds are—or are not—in fact useful or possess useful properties, and to ascertain

> what those properties are. It amounts to an admission that experimentation would be necessary to determine actual uses—or possible lack of uses—of the compounds, as well as how to employ them in a useful manner.)

A chemical intermediate does not satisfy the utility requirement of section 101 unless the utility *of the final product* is disclosed. *See id.* at 944-45; *In re Joly*, 376 F.2d 906, 908 (CCPA 1967). Similarly, an EST does not satisfy section 101 unless the utility of the "final product" is disclosed—*viz.*, the utility of the nucleic acid or the protein or fragment that it encodes. Instead, where the claim is limited to nucleic acids encoding a maize protein or fragment thereof, like Fisher's claim, the specification must disclose more about the nucleic acid, protein and/or fragment, such as sequence and function or real-world significance of the encoded protein.

According to *Kirk*, the utility of the molecule obtainable from the "starting material" is an *essential* element in establishing the utility of the starting material. 376 F.2d at 945. Like the claimed compounds in *Kirk*, the disclosed ESTs in the claim on appeal here are useful—at best—only as "starting material" or intermediates in researching other compounds within the scope of the claimed invention, whose utility Fisher has not disclosed.

Moreover, just because one can use an EST to find the protein-encoding gene corresponding to the EST, it is not guaranteed that the

protein's function is determinable. One can sequence the gene, certainly, and from that, one can deduce the sequence of the protein encoded by the gene. However, the sequence alone provides no specific benefit in currently available form because, to determine the protein's function in maize, extensive research is needed. Indeed, the function of the protein may *never* be determined. Yet, even if the "natural" function of the protein is determined, that protein might still serve no useful purpose under patent law. For example, the protein might not be useful as a diagnostic, target of a new agricultural chemical or drug, or to treat or prevent disease. In fact, it may have no substantial and specific utility to justify a patent.

Fisher's purported utilities involve use of the claimed ESTs in open-ended scientific research. As such, these ESTs are simply objects of scientific research to discover the agronomic relevance of the EST and yet-to-be-discovered molecules, such as the full-length gene comprising the EST or the protein encoded thereby. Such use is not "substantial" or "specific" utility in currently available form.

The Board's finding that Fisher's claimed invention does not meet the utility requirement of section 101is supported by very substantial evidence. A0013-24. This Court should uphold the Board's decision; Fisher's patent should not be granted with the appealed claim.

### C. Fisher's Specification Fails to Provide an Adequate Written Description of the Invention.

*Amici* offer an alternative reason for rejecting the appealed claim: the requirement for written description of the invention found in 35 U.S.C. § 112, first paragraph. "[T]he question whether the invention . . . is patentable or not is always open to the consideration of the court . . . ." *SmithKline Beecham Corp. v. Apotex Corp.*, 365 F.3d 1306, 1321 (Fed. Cir. 2004) (Gajarsa, J., concurring) (quoting *Slawson v. Grand St. R.R.*, 107 U.S. 649, 652 (1882)). *See also Richards v. Chase Elevator Co.*, 158 U.S. 299, 301 (1895). Although uncommon, this Court may raise an issue *sua sponte*. *Id.* at 1323.

*Amici* respectfully assert that Fisher failed to adequately disclose relevant identifying characteristics of a representative number of species within the claimed genus. Thus, according this Court's precedent, Fisher's specification fails to provide a written description of the invention. Although Fisher did not appeal the written description issue, the Court should consider it *sua sponte* because of the important implications of this appeal for literally thousands of other pending patent applications.

### 1. Fisher's Application Fails Under the Written Description Guidelines.

This Court adopted the Guidelines for Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, 66 Fed. Reg. 1099 (Jan. 5, 2001) ("Guidelines")[4] in *Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 323 F.3d 956, 964 (Fed. Cir. 2002), and further noted in *Noelle v. Lederman*, 355 F.3d 1343, 1349 (Fed. Cir. 2004). The Guidelines provide a two-step procedure, with multiple considerations, for determining compliance with the requirement for a written description of the invention.

The first step is to determine what the claim covers as a whole. Guidelines at 1105. "[D]uring examination proceedings, claims are given their broadest reasonable interpretation consistent with the specification." *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir. 2000). The broadest, reasonable interpretation of Fisher's claim is that the claimed nucleic acid molecules are actually five genera of nucleic acid molecules, consisting of the sequences

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[4] The Guidelines differ from the "Synopsis of Application of Written Description Guidelines," which are training examples for USPTO Examiners. Though the training examples for ESTs reach conclusions consistent with this brief, no implication should be drawn that *Amici* agree that each training example correctly applies the Guidelines.

set out in each of SEQ ID NOs:1-5, "with or without any preceding or trailing nucleotides, or other molecules." A0005. The Board found:

> [T]he use of the transitional term "comprising" does not allow for internal alterations (*e.g.* insertions or deletions) of the nucleotide sequences set forth in SEQ ID NO:1 through SEQ ID NO:5, but instead only *allows for the addition of nucleotides or other molecules at either end* of the nucleotide sequences set forth in SEQ ID NO:1 through SEQ ID NO:5.

A0025-26 (emphasis added).

Given this interpretation, Fisher's claim reasonably encompasses any nucleic acid, comprising one EST selected from SEQ ID NO:1-5 and encoding a maize protein. The claim thus includes, as the Board found, "*inter alia,* genes, full open reading frames, fusion constructs, and cDNAs" (A0005), as well as plasmids, naturally-occurring genes, spliced genes, genes with modifications not affecting the encoded protein, fragments of chromosomes, full chromosomes, collections of chromosomes, genetic regions, etc., comprising one of the EST sequences. A0037-38.[5] Considering that any number of nucleotides can be added to either end of the ESTs, the species within the genus are innumerable.

After the broadest reasonable claim interpretation is established, the

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[5] *Amici* do not speculate whether such a claim is novel.

Guidelines' second step requires review of the specification to determine whether the applicant provides adequate written description required by section 112, first paragraph. Guidelines at 1105. For a genus claim such as Fisher's, there must be sufficient description of a representative number of species. Guidelines at 1106 (citing *Regents of Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1568 (Fed. Cir. 1997)).

> The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice . . . , reduction to drawings . . . , or by disclosure of relevant, identifying characteristics, *i.e.*, structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics, sufficient to show that the applicant was in possession of the claimed genus . . . .

Guidelines at 1106.

Except perhaps for the ESTs themselves,[6] Fisher provides no actual reduction to practice or reduction to drawings. As "relevant identifying characteristics," Fisher provides no structure or other physical and/or chemical properties, except for SEQ ID NOs:1-5, which contain 333-429 nucleotides. A0005. An EST represents only a miniscule portion of many

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[6] *See supra* note 3.

molecules within the claim scope, if it is within the claim at all.[7] At most, Fisher's specification describes only five species. Considering the scope of the claim, such minimal description does not suffice as a "representative number of species."

In *In re Wallach*, 378 F.3d 1330 (Fed. Cir. 2004), this Court affirmed a lack of written description for a claimed DNA wherein the description consisted of a partial sequence plus functional language. The appellant provided a partial sequence, approximately five percent, of a protein encoded by the claimed DNA molecule. The court noted:

> Without the approximately 95% of the amino acid sequence that Appellants did not disclose, we cannot say that the DNA molecules claimed in the '129 application have been described. As the MPEP explains, "disclosure of a partial structure without additional characterization of the product may not be sufficient to evidence possession of the claimed invention." MPEP § 2163.II.A.3.a.i.

*Id.* at 1334. Fisher, too, discloses only a tiny and insufficient portion of the claimed nucleic acid.

The Guidelines state that description of a representative number of species may rely on "functional characteristics coupled with a known or disclosed correlation between function and structure." Guidelines at 1106.

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[7] *See supra* note 3.

Clarifying the structure-function requirement, the *Wallach* court stated:

> [S]uch functional description can be sufficient only if there is also a structure-function relationship known to those of ordinary skill in the art. . . . [S]uch a well-known relationship exists between a nucleic acid molecule's structure and its function in encoding a particular amino acid sequence: Given the amino acid sequence, one can determine the chemical structure of all nucleic acid molecules that can serve the function of encoding that sequence. Without that sequence, however, or with only a partial sequence, those structures cannot be determined and the written description requirement is consequently not met.

*Wallach*, 378 F.3d at 1335. The court held that Wallach's application did not meet the written description requirement because "Appellants have provided no evidence that there is any known or disclosed correlation between the combination of a partial structure of a protein, the protein's biological activity, and the protein's molecular weight, on the one hand, and the structure of the DNA encoding the protein on the other." *Id.*

Like *Wallach*, Fisher recites a function for the claimed invention—"encod[ing] a maize protein or fragment thereof." And like *Wallach*, Fisher provides no evidence of any known or disclosed correlation between the partial structure disclosed and the function of encoding maize proteins or fragments thereof. A skilled artisan simply cannot devise the structure of the claimed nucleic acids, or the proteins and fragments that they allegedly encode, merely from EST sequences.

Notably, unlike Fisher, Wallach's protein was further characterized by its physical characteristics and biological activity—namely, the protein's ability to inhibit the cytotoxic effect of TNF, a purification method, and a molecular weight. Wallach's disclosure was much greater than Fisher's, yet this Court found that Wallach's disclosure did comply with section 112, first paragraph. If Wallach's disclosure did not satisfy the written description requirement, then Fisher's disclosure certainly fails to satisfy the requirement.

Fisher completely fails to provide any relevant, identifying characteristics, such as structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics. Therefore, Fisher fails to provide the description required by this Court's precedent and the Guidelines.

### 2. Disclosing a Common Structural Feature Does Not Necessarily Provide a Written Description of the Invention.

Though the nucleic acids within each genera of Fisher's claimed invention share the common structural feature of the sequence of a particular EST that may distinguish the members of the claimed invention from non-members, this alone does not comply with the requirement for a written

description of the invention. Rather, a "precise definition" of the claimed genus of nucleic acids is required such that a skilled artisan can recognize that the inventor had possession of the claimed invention. *Lilly*, 119 F.3d at 1567; *Fiers*, 984 F.2d at 1171. Fisher's claimed invention is much larger than the five ESTs disclosed; indeed, Fisher's invention may include "*inter alia,* genes, full open reading frames, fusion constructs, and cDNAs." A0005. A description of merely a very small piece, though common to all genus members, fails to meet this standard.

Fisher's common structural feature—*i.e.*, the EST—provides no commonality of properties or function for the genus. If an EST encodes anything, it would encode a fragment of a protein, which would have entirely different properties than proteins encoded by a larger nucleic acid incorporating the EST. Indeed, the larger nucleic acid and the EST certainly have no common function. Again, Fisher fails to demonstrate possession of all nucleic acids within the scope of the claimed invention. Accordingly, the claim should be rejected for failure to meet the written description requirement of section 112, first paragraph.

**3. Fisher's Open-Ended DNA Claim Is Not Allowable.**

This Court, in *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495 (Fed. Cir. 1997), noted that "'[c]omprising' is a term of art used in claim

language, which means that *the named elements are essential*, but other elements may be added and still form a construct within the scope of the claim." *Id.* at 501 (emphasis added). The *essential* elements—those that define a complete and operable invention—are missing from Fisher's specification and claim.

In *Genentech*, this Court considered a claim to "[a] DNA construct comprising a sequence coding for human insulin-like growth factor-I joined in proper reading frame with *Saccharomyces* alpha-factor secretory leader and processing signal sequence." *Id.* at 497. The court acknowledged that the term "comprising" is open-ended and therefore allowed additional amino acids to be inserted between the essential claim elements. However, the court also noted that "[n]o dispute exists that Genentech's DNA construct . . . contains the *complete* DNA sequences for these three proteins in its DNA construct." *Id.* at 501 (emphasis added). Consequently, where the claims define each essential element and the disclosure of the DNA is complete, "comprising" *per se* is not problematic.[8]

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[8] A nucleic acid comprising an EST and encoding a protein or fragment whose utility is described could be a complete characterization of an invention. If such nucleic acids are patentable, then open-ended claims to constructs comprising nucleic acids may be permissible. For example, nucleic acids encoding a protein or fragment with known utility may be incorporated into vectors to express the protein or fragment. Such nucleic

However, it is well recognized in a closely related art field that "comprising" does not allow one to claim an invention by defining only an incomplete piece. Even if novel, a chemist could not claim, "A compound comprising the radical 'phenyl.'" This claim would be invalid under 35 U.S.C. § 112 because "phenyl" does not represent a complete characterization or the essential element of any invention, but instead only defines a piece of an innumerable number of species—each having different properties. *See, e.g.*, *Ex parte Diamond*, 123 USPQ 167 (Bd. Pat. App. 1959); *Ex parte Pedlow*, 90 USPQ 395 (Bd. Pat. App. 1951), and *Ex parte Appeal 12,749*, 30 J.P.O.S. 479 (1948). Allowing such a claim would invoke a race to the patent office to claim the smallest novel piece, regardless whether such piece has utility.

Fisher's claimed nucleic acids are similar; the disclosed EST is only a piece of something. It is not a complete characterization. Any proteins or fragments encoded by Fisher's claimed invention have no known utility. Thus, an open-ended claim is not appropriate in the current case.

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acid may also be incorporated into "fusion" constructs encoding a complete, functional fragment or protein "fused" to different proteins or fragments.

**D. Fisher's Specification Fails to Enable the Full Scope of the Claim.**

"[T]he enabling disclosure of the specification [must] be commensurate in scope with the claim under consideration." *Chiron Corp. v. Genentech Inc.*, 363 F.3d 1247, 1253 (Fed. Cir. 2004) (quoting *In re Hyatt*, 708 F.2d 712, 714 (Fed. Cir. 1983)). Even if Fisher's disclosure were found to meet the utility requirement of section 101, it does not disclose how to make and use all possible nucleic acids within the claim's scope. Fisher's claimed invention includes "*inter alia,* genes, full open reading frames, fusion constructs, and cDNAs" (A0005) as well as plasmids, naturally-occurring genes, spliced genes, genes with modifications not affecting the encoded protein, fragments of chromosomes, full chromosomes, collections of chromosomes, genetic regions, etc., comprising one of the EST sequences. A0037-38. Determining the use of these species across the breadth of the claim and which of these species are operable would require undue experimentation, thereby failing to meet the enablement requirement of 35 U.S.C. § 112, paragraph 1, even if any of the research proposals alleged to provide compliance with section 101 were accepted.

## IV. CONCLUSION

*Amici* agree with the Patent and Trademark Office that the application of this appeal should not be granted. For the abovementioned reasons, *Amici* respectfully request that this Court affirm the Board's holding regarding utility and lack of enablement. *Amici* also respectfully request that this Court *sua sponte* find that Fisher's specification fails to meet the requirement for a written description of the invention.

Respectfully submitted,

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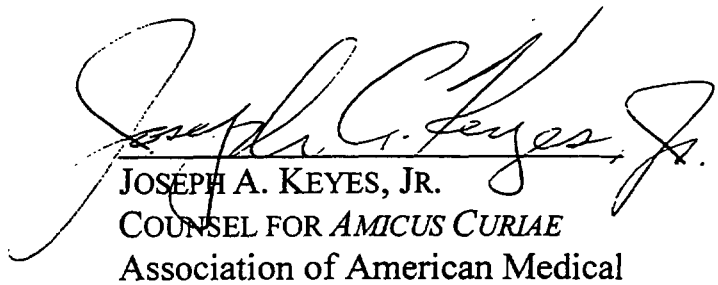

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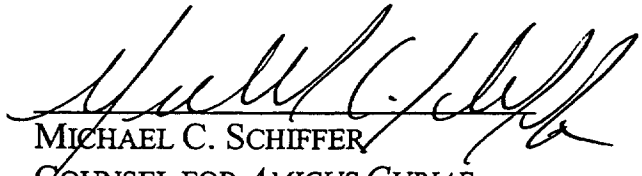

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## CERTIFICATE OF SERVICE

I hereby certify that on this 14th day of December, 2004, two bound copies of the foregoing BRIEF FOR *AMICI CURIAE* were caused to be served, via Federal Express, to:

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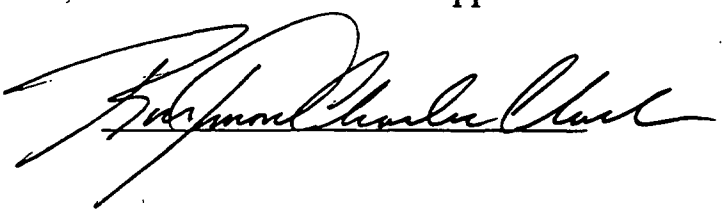

## CERTIFICATE OF COMPLIANCE

*Amici curiae* Eli Lilly and Company, Association of American Medical Colleges, Baxter Healthcare Corporation, National Academy of Sciences, Dow AgroSciences LLC, and American College of Medical Genetics submit their brief under Rules 32(a)(5)(A) and 32(a)(7)(B) of the Federal Rules of Appellate Procedure. As required by Rule 32(a)(7)(C), I hereby certify that *amicus curiae* Eli Lilly and Company, Association of American Medical Colleges, Baxter Healthcare Corporation, National Academy of Sciences, Dow AgroSciences LLC, and American College of Medical Genetics' brief complies with the type-volume limitation therein provided, and I further certify that the foregoing BRIEF FOR *AMICI CURIAE* ELI LILLY AND COMPANY, ASSOCIATION OF AMERICAN MEDICAL COLLEGES, BAXTER HEALTHCARE CORPORATION, NATIONAL ACADEMY OF SCIENCES, DOW AGROSCIENCES LLC, and AMERICAN COLLEGE OF MEDICAL GENETICS, contains 6994 words. In preparing this certificate, I have relied on the word count of the word processing system used to prepare this brief, including headings, footnotes, and quotations.

By: Paula K. Davis

Dated: December 14, 2004