

US Supreme Court rejects personalised medicine claims

A major decision from the US Supreme Court questions the scope of what can be considered as patentable subject matter. It could have major implications in the life sciences industries and beyond

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On 20th March 2012 the US Supreme Court issued a surprisingly unanimous decision in *Mayo Collaborative Services v Prometheus Laboratories, Inc*, holding that method claims that involved administering a drug to a patient and determining the therapeutic effect were not patentable subject matter. The court specifically held that the correlations between the drug being administered and the concentrations of certain metabolites in the patient's blood were a "law of nature", and thus not directly patentable. The claimed processes, while not natural laws themselves, did not sufficiently transform the nature of what was being claimed, and were thus also not patentable. Although *Mayo* arguably did not have as high a profile as the *Bilski* case two years ago, the *Mayo* decision has the potential to wreak far greater havoc on the US patent community.

The patents in question

Prometheus Laboratories is the exclusive licensee of two patents claiming the use of thiopurine drugs to treat autoimmune diseases. When ingested, the drugs are metabolised and produce metabolites in the patient's bloodstream. The claims are directed to processes to identify correlations between metabolite levels and the likely harm or ineffectiveness of the

drug with regard to that patient. The representative claim that was examined by the courts (which appears in the accompanying box) recites an administering step (ie, the physician administers the drug to the patient), a determining step (ie, the physician measures the resulting metabolite levels), and a "wherein" step (ie, a clause describing the metabolite concentrations above which there is a likelihood of harmful side effects and below which there is a likelihood of ineffectiveness). The physician is informed that concentrations above or below either threshold indicate a need to decrease or increase the drug dosage.

Mayo announced that it intended to sell and market a similar diagnostic test. Prometheus sued *Mayo* for patent infringement and *Mayo* challenged the validity of the claims. The district court found that the claims effectively claimed natural laws or phenomena, and declared them invalid. On appeal, the Federal Circuit Court of Appeals initially reversed, holding that the claims met the transformation element of the "machine-or-transformation" test which had been developed as a means for testing patent eligibility. The case was remanded by the Supreme Court for further consideration in light of its *Bilski* decision, but the Federal Circuit reaffirmed its earlier conclusion.

Opinion

The Supreme Court reversed the Federal Circuit. The court's starting point was that the relationship between the metabolite concentrations and the likelihood that the thiopurine drug dosage would be harmful or ineffective was a "law of nature", and thus was not patentable. The claimed processes were applications of a law of nature, and would be patentable only if they had additional features that provided practical



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assurance that the processes were genuine applications of those laws, rather than an attempt to monopolise the correlations. "A patent, for example, could not simply recite a law of nature and then add the instruction 'apply the law'."

In this case, the court determined that none of the steps of the method claims met this standard. First, the "administering" step simply referred to a relevant audience (ie, doctors who treated patients with thiopurine drugs). This was a pre-existing audience, and doctors had been using thiopurine drugs to treat patients long before the claims were asserted. Second, the "determining" step simply told the doctor to determine the level of relevant metabolites in the blood, using whatever process the doctor or laboratory wished to use. This step thus told the doctor to engage in "well-understood, routine, conventional activity previously engaged in by scientists who work in the field". Third, the "wherein" clauses simply informed the doctor about the relevant natural laws, and at most added a suggestion to take those laws into account.

The court did consider the steps to be an ordered combination, since a new combination of steps in a process may be patentable even if all components of the combination were previously well known and in use. However, in this case the court found that the combination added nothing to the laws of nature that was not already present. In short, the claims informed the relevant audience about certain laws of nature and the remaining steps comprised only "well-understood, routine, conventional activity".

The court also expressed its continued concern that "patent law not inhibit further discovery by improperly tying up the future use of laws of nature". It recognised that rewarding those who discover new laws of nature with patents might encourage those discoveries, but the danger of inhibiting future innovation by tying up the use of these "basic tools of scientific and technological work" was greater. In other words, granting a patent for such a discovery "forecloses more future invention than the underlying discovery could reasonably justify".

The *Mayo* decision puts to rest (at least temporarily) the debate in the patent community about the screening role of subject-matter patentability. Many participants, including the federal government, have argued that subject-matter patentability should be a relatively low hurdle, and that other statutory

requirements (eg, novelty and obviousness) are better suited for determining whether a patent should be issued. The court rejected these arguments, firmly holding that the Section 101 patent eligibility inquiry is a significant threshold question and not to be taken lightly. In particular, the court noted that shifting the patent eligibility inquiry to other statutory sections would significantly increase legal uncertainty, and may ask those provisions to do work for which they are not equipped.

Impact

The reach of *Mayo* is already being foreshadowed in two recent decisions.

Patentability of human genes

Shortly after issuing its *Mayo* decision, the court granted certiorari in *Association for Molecular Pathology v Myriad Genetics, Inc*, vacated the Federal Circuit ruling and remanded for further consideration in light of *Mayo*. In *Myriad Genetics*, the federal court upheld the patentability of certain breast cancer gene patents, holding that "isolated DNA" was not a natural product. This is the same process to which the Supreme Court subjected *Mayo v Prometheus* after its *Bilski* decision. The Federal Circuit upheld its previous finding of patentability in *Mayo* on remand, and it is that decision that the Supreme Court reversed unanimously. This pattern does not bode well for the original Federal Circuit holding in *Myriad Genetics*. In fact, if *Myriad Genetics* follows the road that *Bilski* and *Mayo* have taken, it may well become the third case of a patent subject-matter trilogy shaping patent law in the United States for decades to come.

The argument to apply *Mayo* appears inevitable. DNA (and the genetic information contained therein) is a product of nature, as is the correlation between certain genetic sequences and the resulting biological condition. More particularly, the correlation between the presence of naturally occurring mutations in the breast cancer genetic sequences and the likelihood of certain types of cancer is a natural law. Thus, claims directed to those genetic sequences and correlations are directed to products or laws of nature, and are therefore unpatentable. Any steps in related method claims comprise only "well-understood, routine, conventional activity" already carried out by scientists in the field, and thus add nothing significant to the patentability question.

Myriad Genetics raises the same concern about improperly tying up the future use of

Claim 1 of US Pat No 6,355,623:

A method optimizing therapeutic efficacy for treatment of an immune-mediated gastrointestinal disorder, comprising:

- (a) administering a drug providing 6-thioguanine to a subject having said immune-mediated gastrointestinal disorder; and
- (b) determining the level of 6-thioguanine in said subject having said immune-mediated gastrointestinal disorder, wherein the level of 6-thioguanine less than about 230 pmol per 8x10⁸ red blood cells indicates a need to increase the amount of said drug subsequently administered to said subject and wherein the level of 6-thioguanine greater than about 400 pmol per 8x10⁸ red blood cells indicates a need to decrease the amount of said drug subsequently administered to said subject.

laws of nature. The argument was made in the lower courts that the breast cancer gene patents precluded researchers and others from conducting any research involving these genes, including the development of other, more refined methods of determining the likelihood of breast cancer. This same argument will now undoubtedly take the forefront of the attack.

Patentability of computer-implemented medical expert systems

In *SmartGene v Advanced Biological Laboratories* the US District Court for the District of Columbia – only 10 days after the *Mayo* decision – relied on it to hold that the patent for a computer-based “expert system” for guiding the selection of therapeutic treatment regimes for complex disorders was invalid, because it was not directed to patentable subject matter. The claimed process was a step that was performed in doctors’ offices every day in evaluating and treating patients, and added nothing patentable to the process. The steps consisted of well-understood, routine conventional activity that doctors already mentally engaged in; even if the claimed computing device simplified data gathering and computation functions, “a claimed invention is nevertheless unpatentable if it may be entirely performed through mental processes”.

Outlook

Patent eligibility jurisprudence will remain inconsistent for some time at best. In a second post-*Mayo* case, the US District Court for the Northern District of California in

Nazomi Communications, Inc v Samsung Telecommunications, Inc rejected the argument that a method of executing computer instructions more efficiently was not patentable subject matter. The district court held that the claims were more specific than a generalised abstract method and applied only to interpreted languages, not compiled computer languages. The court noted that the claims involved ideas that had no substantial practical application, except in connection with computer instructions. This implies that a computer’s ability to carry out method steps may be an important factor in patentability.

Based on these cases, *Mayo* is likely to have a more significant impact than the *Bilski* decision from two years ago. The *Mayo* opinion is unanimous, and the court has now firmly established Section 101 subject-matter patentability as an important, not-to-be-ignored threshold question. It also appears to have adopted a fairly broad definition of “law of nature”. Laws of nature are not limited to basic concepts and theories, such as the law of gravity or E=mc², but now include things that are more specific, such as “relationships between concentrations of certain metabolites in the blood and the likelihood that a dosage of a thiopurine drug will prove ineffective or cause harm”. This greatly increases the potential for existing patents to be attacked on the grounds that they are effectively claiming a law of nature, and raises the hurdle for patent applications. The reasoning of *Mayo* may thus undermine not only a variety of pharmaceutical patents, but a host of patents involving computer-based methods and systems in general. ■

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