United States

The impact of *Mayo v Prometheus*

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On March 20 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 effects 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 blood of the patient were a 'law of nature' and thus not patentable directly. The claimed processes, while not natural laws themselves, did not sufficiently transform the nature of what was being claimed and thus also were not patentable.

While *Mayo* arguably has not had as high a profile as the *Bilski* decision over two years ago, it has the potential to wreak far greater havoc on the US patent community. More importantly, there is a strong possibility that more is yet to come from the Supreme Court on patentable subject matter — *Bilski* and *Mayo* could be just the first two of a possible modern 'Section 101' trilogy. *Bilski* was round one, focusing on whether the business method claims were too abstract; *Mayo* is the second round, focusing on whether the drug administration claims were an attempt to patent a law of nature; and, as discussed below, the *Myriad Genetics* gene patenting case may well complete the set.

The Prometheus patents

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 examined by the courts 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 or 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.

As an example, Claim 1 from US Patent No 6,355,623 recites:

"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."

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 the claims 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.

The *Mayo* decision

The US 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 not patentable. The claimed processes were applications of a law of nature and would not be patentable unless they had additional features that provided practical 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 treat patients with thiopurine drugs). This was a pre-existing audience; 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 used. This step thus only 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 as 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". The court recognised that rewarding those who discover new laws of nature with patents might well 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 also 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 issue. 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 might ask those provisions to do work that they are not equipped to do.

USPTO guidance

On July 3 2012 the US Patent and Trademark Office (USPTO) issued its guidance for patent examiners on applying the *Mayo* decision to pending application. Termed the "2012 Interim

Procedure for Subject Matter Eligibility Analysis of Process Claims Involving Laws of Nature", the memorandum provides a three-step inquiry in the form of questions to be answered by an examiner.

First, is the claimed invention directed to a process (or method) defined as an act or a series of acts or steps? If not, then the analysis is not applicable. If so, then the examiner proceeds to the next inquiry.

Second, does the claim focus on use of a law of nature, a natural phenomenon or a naturally occurring relation or correlation (collectively referred to as a 'natural principle')? Is the natural principle a limiting feature of the claim? If a natural principle is not a limitation of the claim, the claim does not focus on the use of a natural principle and no further analysis under the guidance is needed.

Third, if the claim does focus on the use of a natural principle, does the claim include additional steps or elements (or a combination of steps or elements) that integrate the natural principle into the claimed invention so that the natural principle is practically applied, and are sufficient to ensure that the claim amounts to significantly more than the natural principle itself? In the words of *Mayo*, is it more than a law of nature plus the general instruction simply to apply it? The guidance notes that adding steps to a natural biological process that only recites well-understood, routine, conventional activity previously engaged in by researchers in the field is insufficient.

The USPTO's *Mayo* guidance details several relevant factors that are useful for the inquiry and even provides several examples of claims that meet or fail this analysis. These provide an excellent roadmap for drafting method claims that the USPTO will find acceptable under *Mayo* going forward.

Myriad Genetics

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 had upheld the patentability of certain breast cancer gene patents, holding that isolated DNA was not a natural product. On remand, the same Federal Circuit panel in August 2012 reaffirmed its prior ruling after considering *Mayo v Prometheus*, thereby setting the *Myriad* case up for review by the US Supreme Court, if *certiorari* is sought and granted.

Interestingly, this is a process similar to that which the court subjected *Mayo v Prometheus* to after its *Bilski* decision. The Federal Circuit had upheld its previous finding of patentability in *Mayo* on remand, and it is that decision that the court reversed unanimously. If *Myriad Genetics* follows the road that *Bilski* and *Mayo* have taken, it may well become the third case of a subject matter or Section 101 trilogy shaping patent law in the United States for decades to come.

Post-*Mayo* jurisprudence

Separately, in the first district court decision applying *Mayo*, the US District Court for the District of Columbia in *SmartGene v Advanced Biological Laboratories*, only 10 days after the *Mayo* decision, relied on it to hold that a patent for a computer-based expert system for guiding the selection of therapeutic treatment regimes for complex disorders was invalid as not being directed to patentable subject matter. The process claimed was a step that was performed in doctors' offices every day by evaluating and treating patients and did not add anything patentable to the process. The steps consisted of well-understood, routine, conventional activity already engaged in mentally by doctors. Even if the claimed computing device simplified data gathering and computation functions, the court held that "a claimed invention is nevertheless unpatentable if it may be entirely performed through mental processes".

Patent-eligibility jurisprudence will remain inconsistent for some time, at best. In a second post-*Mayo* case, *Nazomi Communications, Inc v Samsung Telecommunications, Inc*, the US District Court for the Northern District of California rejected the argument that methods of executing computer instructions more efficiently were not patentable subject matter. The district court held that the claims were more specific than a generalised abstract method and did not apply to compiled computer languages — only to interpreted languages. The court noted that the claims involved ideas that had no substantial practical application, except

in connection with computer instructions. This implies that whether method steps can be carried out only by a computer may be an important factor in patentability.

Based on the above cases, as an individual decision, *Mayo* may have a more significant impact than the *Bilski* ruling from two years ago. The *Mayo* opinion is unanimous and the court now has firmly established Section 101 subject matter patentability as an important threshold question. It also appears to adopt a fairly broad definition of what constitutes a 'law of nature'. Laws of nature are not limited to basic concepts and theories (eg, the law of gravity or E=mc2), but now include elements 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 increases the potential for existing patents to be attacked on the grounds that they are effectively claiming a law of nature, as well as raising the hurdle for patent applications, as seen by the USPTO *Mayo* guidance. Thus, the reasoning of *Mayo* may undermine not only a variety of pharmaceutical patents, but also a host of patents involving computer-based methods and systems in general. iam

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