



## **The Subcommittee for Biotechnology and Plant Variety Rights**

### **Position Paper**

### **Gene Patenting**

#### About AIPPI

The International Association for the Protection of Intellectual Property, generally known under the abbreviated name AIPPI, is the world's leading international organization dedicated to the development and improvement of legal regimes for the protection of intellectual property (IP).

It is a politically neutral, non-profit organization, domiciled in Switzerland, which currently has over 9000 members representing more than 125 countries. The objective of AIPPI is to improve and promote the protection of intellectual property on both international and national base. It pursues this objective by working for the development, expansion and improvement of international and regional treaties and agreements and national laws relating to intellectual property. AIPPI operates by conducting studies of existing national laws and proposes measures to achieve harmonization of these laws on an international basis. Where appropriate, AIPPI intervenes with submissions before major courts and legislative bodies to advocate for strengthened IP protection.

#### Previous AIPPI Studies

By its Resolution on Q114 – "Biotechnology" (1995, Montreal), AIPPI resolved that all biotechnological inventions, including isolated genes, regardless of source, which are novel, inventive and have industrial applicability, should be patentable. In the study leading to the Resolution on Q150 – "Patentability requirements and scope of protection of expressed sequence tags (ESTs), single nucleotide polymorphisms (SNPs) and entire genomes" (2000, Sorrento), AIPPI concluded these must be considered patentable subject matter, assuming all patentability criteria were met. It was also concluded that further studies with respect to specific requirements and scope of protection of DNA sequence data collections be carried out.

This position paper does not affect or disagree with resolutions from these earlier studies but rather builds on their conclusions taking account of more recent developments in jurisprudence in certain jurisdictions.

#### The Subcommittee for Biotechnology and Plant Variety Rights

This position paper has been prepared by the Subcommittee for Biotechnology and Plant Variety Rights, the subcommittee of AIPPI's Standing Committee on Pharma and Biotechnology. The subcommittee consists of members from Europe, the Americas, Asia and Australia. It has conducted a study into the intellectual property rights currently available for isolated genes, both

human and non-human, in a variety of territories. The findings are reported below together with commentary from the subcommittee on this topic.

### Gene patenting

In April 2003 it was announced that the project to provide the DNA sequence of the entire human genome was completed. Prior to this time, the full sequence of the genomes of other organisms had been made publically available. From the earliest gene cloning experiments of the 1980s the nucleotide sequence and function of many genes had already been discovered and, in isolated form, these genes began to become the subject of patents around the world. These have included genes from microorganisms, plants, insects and animals with industrial and agricultural applications as well as human genes, including disease-associated variants, having practical applications in diagnostic and therapeutic settings. The patenting of genes when isolated from their natural environment has always been controversial but in Europe, after some considerable debate, the practice gained acceptance with the introduction in July 1998 of EU Directive 98/44/EC on the legal protection of biotechnological inventions. The Directive provides that biotechnological inventions shall be patentable if they concern biological material which is isolated from its natural environment or produced by means of a technical process, even if it previously occurred in nature (Article 3(2)). This principle is applied to elements isolated from the human body, including the sequence or partial sequence of a gene, even if the structure of the element is identical to a natural element (Article 5(2)). However, the simple discovery of such an element cannot constitute a patentable invention (Article 5 (1)). An important further provision of the Directive is that the industrial application of a sequence or partial sequence of a gene must be disclosed in the patent application (Article 5(3)). Failure to do this will be fatal to the application.

The provisions of the Directive have been introduced into the implementing regulations to the European Patent Convention (see Rule 29 EPC) and implemented into the national laws of each of the EU member states. The Directive has been drafted into UK Statutes and thus is fully expected to remain following the UK exit from the EU. The case law of the Boards of Appeal of the EPO has established that the function of the gene must at least be made plausible in the application as filed ( e.g.T1329/04). Further, information as to the function provided only after the filing date cannot be used to support a finding of inventive step. A similar approach is taken in various EU member states.

However, implementation of EU Directive 98/44/EC nationally has not been consistent across the member states. While the need to disclose a credible industrial application for an isolated gene is collectively recognised, in some EU countries, for instance France, Germany and Italy, the respective national laws specify that a claim to isolated human DNA only protects it to the extent that it is used for the identified industrial application. Any subsequent new use will not be protected.

Most importantly, in decision C-428/08 of July 6<sup>th</sup> 2010 (Monsanto LLC v Cefetra BV and others) the European Court of Justice (CJEU) clarified that national (patent) legislation is precluded from offering “absolute protection” to patented DNA as such, “regardless of whether it performs its function in the material containing it”; see judgement at [62 and 63]. Accordingly, even though the

EPO grants (product) claims to isolated nucleic acids as such, the protection actually conferred by such claims may be considerably reduced in EU member states during infringement proceedings.

Much of the historical discourse in Europe on patenting genes has concerned the ethics of patenting human DNA in particular, rather than the isolation of natural elements such as genes from other species. However, the more general proposition of whether products isolated from a natural environment could be the subject of a patent claim has been brought into sharp focus by the patents of Myriad Genetics, Inc for the BRCA1 and 2 genes, known to increase predisposition to breast cancer. In the United States of America (**U.S.**), in a challenge to Myriad's patents lodged by the Association for Molecular Pathology, the Supreme Court held that a DNA segment in a naturally occurring setting does not become patent eligible merely by being "isolated". It is not saved by the breaking of chemical bonds but is still considered a product of nature and thereby implicitly excluded from patentability according to 35 U.S.C. §101. This prohibition was not held to apply to cDNA in which the naturally occurring introns were removed or other "modified" forms of DNA. However, it does have implications for the patenting of non-human intronless genes, short nucleic acid molecules such as primers or probes or non-coding RNA, all of industrial, agricultural or medical utility, with a sequence identical to one occurring in nature.

The Myriad patents have also been challenged in Australia, where the High Court decided that claims to isolated nucleic acid sequences encoding the BRCA1 mutant polypeptide were invalid by virtue of not defining a "manner of manufacture". Rather the substance of the invention was considered to be the information embodied in the sequence of nucleotides of the molecule. This was deemed to be an inherent part of the molecule, not made, created or modified by human action.

Following the Myriad decision, isolated naturally occurring nucleic acid molecules, whether DNA or RNA, human or non-human, coding or non-coding are no longer patentable in Australia. Also not patentable are cDNA, synthetic nucleic acids, probes and primers or interfering/inhibitory nucleic acids in situations where they merely replicate the genetic information of a naturally occurring organism.

Other countries around the world take different approaches to gene patenting, adopting positions which are variations on those now applied in Europe, Australia or the U.S. For example, in Japan, China, Korea and Canada, isolated DNA, including human DNA, is patentable in principle, provided that function and industrial application are provided by the patent application. The extent to which this industrial application must be demonstrated experimentally across the scope of the claims varies and biological data may be required. Furthermore, in China it is necessary to indicate that any genetic resource from which the gene was isolated has been legally obtained. India is similar to the U.S. and Australia whereby DNA isolated from nature is not patentable unless it has been modified by human intervention on or after the isolation procedure. Again the provision of an industrial application is essential.

Elsewhere the picture is mixed from applications of the permissible approach provided by EU98/44/EC to complete prohibition of all DNA patenting. At present it is not clear whether the developments in the U.S. and Australia will have any influence on such jurisdictions.

#### AIPPI Commentary

The review of international patentability of isolated nucleic acid molecules confirms we have moved into an era in which the lack of international harmonization as to what may be protected is as stark as it has ever been. This must be seen as undesirable. Intellectual property protection systems exist to incentivise innovation and, importantly, investment in it. Finding practical applications which benefit society for genetic materials needs to be encouraged.

The current situation will have a negative impact on future innovations, such as the rapidly emerging and potentially exciting field of non-coding RNA therapeutics, many of which will not be patentable in at least the U.S. and Australia, following the Myriad decisions. Further, the biotechnology industry has evolved in an era in which gene patents have been freely granted. Many of these will now be unenforceable, affecting the commercialisation and availability of the products they originally protected and creating an inability to recoup earlier investment.

There exists international consensus that patentability requirements worldwide should be harmonised in the form of the TRIPS agreement, Article 27(1) of which provides that patents shall be available for any inventions, whether products or processes, in all fields of technology, provided they are new, involve an inventive step and are capable of industrial application. Articles 27(2) and 27(3) allow members to exclude from patentability certain categories of invention. These are inventions the commercial exploitation of which would be contrary to *ordre public* or morality, diagnostic, therapeutic and surgical methods for the treatment of humans and animals, plants and animals other than microorganisms and essentially biological processes for the production of plants and animals other than non-biological and microbiological processes.

The patenting of biological materials isolated from nature by a technical process and which have a practical application is not something immediately amenable to exclusion under these articles. In this context it must be taken into account that isolated genes and other nucleic acid molecules do not exist in that form in nature. Even on the assumption that the isolated molecules are in all ways identical to their *in-vivo* counterparts, merely knowing something exists in nature is not the same as having that thing accessible for use in an applied setting. All jurisdictions which are currently permissive of gene patenting require a credible industrial application for the molecule to be given and, in some cases, demonstrated. It is this which elevates the isolated genetic material from a mere discovery to an invention, to which TRIPS provisions must be applied. Not in all cases will the isolated nucleic acid be regarded as meeting the requirements of novelty, inventive step and industrial application which are internationally agreed upon as the criteria to be applied for patentability and as also confirmed by TRIPS. These criteria are sufficient to restrict patent monopolies to those genetic materials, the development of which will make the greatest technical contribution to mankind, always provided they receive sufficient investment for which the existence of a patent will be key. Disregard for the TRIPS agreement is clearly undesirable both for political reasons and because the encouragement to innovate which lies behind it is undermined.

EU Directive 98/44/EC has been in force for eighteen years. Although there has been some judicial interpretation from the Court of Justice of the European Union (CJEU) on gene patenting in C-428/08, the specific issue of gene patenting *per se* and its enforcement in national European jurisdictions has not been further considered. However, as already mentioned Article 5(3) of EU 98/44/EC requires that the industrial application of a sequence or partial sequence of a gene must be disclosed in the patent application. On implementation of the Directive, some EU member states have put a restriction on the scope of protection by specifying in their national law that a claim to isolated human DNA only protects it to the extent that it is used for the identified industrial application. Thus, certain subsequent new uses will not be protected, with the potential exception of medical uses, like, *inter alia*, “second medical uses” in gene therapy approaches. Such a restriction would seem to go beyond the intention of the Directive and would seem to thwart the legal harmonisation it was intended to introduce. The extent to which this is a problem has not been evaluated but an opportunity for the CJEU to apply a harmonised interpretation to the Directive on scope of protection of gene patents, which can then be applied in the EU member states would be welcomed.

While the patenting of genetic material remains controversial, if patent law exists to incentivise the introduction of useful innovations to society, then it should ensure that patents are available for novel, inventive and industrially applicable developments where something valuable is made available to the public which it previously did not have. Governments are urged to address this lack of international harmonisation, to ensure that TRIPS is respected and to maintain a stable intellectual property system which continues to incentivise innovation and maintain investment, especially in the healthcare sector.

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