

Patenting Biotechnology Inventions in The European Patent Office *By Jane Massey Licata*

I. A Brief Overview of EPO Patents

The European Patent Office (EPO) came into existence in 1977 and currently handles about 100,000 applications per year. The EPO is regulated by a treaty known as the European Patent Convention (EPC) which provides a system by which a unitary application for patents can be prosecuted for a group of designated countries¹. When a patent is granted by the EPO it is treated in each of the designated countries as equivalent to their national patent, subject to the provisions of the EPC.

European patents are granted for inventions that are susceptible to industrial application, are new and involve an inventive step². Any technology capable of such industrial application may be patented except for discoveries, scientific theories and mathematical methods; aesthetic creations; schemes; rules and methods for mental acts, playing games and doing business; programs for computers and presentation of information; methods for treatment of the human or animal body by surgery or therapy; and diagnostic methods. Medical use claims are patentable under European practice when the inventive step lies in the use of a compound for the treatment of a disease³.

In addition, to be patentable the application must have a filing or priority date which is before public disclosure anywhere or in any way of the invention. Further, with respect to biotechnology inventions which may require a deposit of biological material this means that the deposit must be made before the application is filed, in contrast to U.S. practice where the deposit may be made up to the time of issuance of the patent.

The EPC contains several important special exceptions to patentability. European patents will not be granted for inventions which would be contrary to the "public order" or morality or for plant or animal varieties or essentially biological processes for the production of plants or animals⁴. Microbiological inventions are patentable.

The EPC does not precisely define what type of subject matter is contrary to public order or morality. However, the EPO has stated that inventions should be considered immoral only in very limited cases in which there appears to be an "overwhelming consensus" that the exploitation or publication of the invention would be such, and that this must be decided on the merits of each case⁵. Simply patenting genetic material is not considered to be contrary to the "public order" or morality.

II. Patenting Biotechnology Inventions in the EPO

Over the past decade, there have been significant ethical, environmental and economic debates which have affected the development of EPO policy concerning the patenting of biotechnology inventions. The provision of European patent law which allows consideration of an invention's effect on the public order or morality is unique. This concept has provided standing to concerned citizens, empowering them to challenge any patent, before or after it issues, on the grounds that such issuance is morally offensive. This process has allowed European citizens to use the judicial process to shape the laws regulating biotechnology inventions⁶.

Although recent decisions of the EPO Technical Board have addressed the exceptions to patentability in the context of genetically engineered life forms, there is no clear line yet between what is to be considered a patentable "microbiological" process and a nonpatentable "essentially biological" process. Further, since there are no binding definitions for these terms in the EPC, the potential exists for differing interpretations and applications of these terms among the various members nations' courts. The principles of public order and morality have also been addressed but the decisions are not completely consistent.

One of these decisions is the famous Harvard Onco mouse case⁷. The invention is a genetically altered mouse having an activated oncogene inserted into its DNA which gives the mouse a highly increased propensity to develop cancer. The EPO Examining Division initially rejected the application, interpreting the term "animal variety" in Article 53 (b) to exclude any patent on an animal⁸. This rejection was based on the legislative history behind the drafting of this section which was interpreted to be intended to exclude animals in general from patentability. In addition, some of the claims included the offspring of the genetically altered mice which was an essentially biological process and therefore not patentable. The inventors appealed and the Board reversed the Examining Division and remanded the case for further determination. The Board held that the wording of Article 53(b) precludes an interpretation excluding animals in general because both "animal varieties" and "animals" are used in the same provisions; therefore the legislators could not have intended for the terms to mean the same thing. The Board directed the Examining Division to determine whether or not the subject matter of the application was an "animal variety" and suggested a balancing test wherein the interest of the inventor in obtaining reasonable protection should be balanced with society's interest in excluding certain categories of animals from patent protection. Then, if the invention was not an "animal variety" within the meaning of 53(b), it should be determined whether the subject matter is derived from an essentially biological process. Ultimately it was decided that the process of introducing an activated oncogene sequence into the cells of the animal was not a process barred under 53(b). Claims in this application were directed to non human mammals and rodents. Comments in the decision indicate that it may be wise when drafting to transgenic animals to have them drawn to a taxonomic classification unit higher than a species so long as there is not a serious doubt that the invention could not be performed successfully on all animals covered by the claims.

In addressing the issues of morality and public order, the Board suggested a balancing test involving a careful weighing of the suffering of animals and possible risks to the environment on the one hand and the invention's usefulness to mankind on the other. In this case, the invention's use as a cancer research tool was found to outweigh concerns about animal suffering or risk to the environment. Therefore, animal research test models appear to be patentable.

In a subsequent case involving the neutralization of the glutamine synthetase inhibitor in plants, the Board suggested an approach for evaluating inventions concerning genetically engineered plants⁹. The Board determined that a process for producing plants is not essentially biological if it comprises at least one essential technical step which cannot be carried out without human intervention and which has a decisive impact on the final result. The Board also recognized that microbiology combines traditional techniques, such as fermentation and biotransformations, with genetic engineering techniques and that the term "microorganism" encompassed bacterial and yeast cells and other fungi, protozoa, algae and human, plant and animal cells which can be cultured and maintained. The process claims for transforming plant cells with recombinant DNA could comprise an essentially technical step which has a decisive impact on the desired end result. With respect to product claims relating to the plant cells, the cells

would not fall under the definition of a plant or plant variety. However, a product claim to transformed plants would not be allowable as the plants would be unpatentable plant varieties. In this case, it was found that the claimed plants were not produced by a microbiological process because a multi-step process was involved which included not only the initial microbiological recombinant DNA transformation procedure, but also steps of regenerating the plants from transformed plant cells and of reproducing them.

These qualifications of the term "microbiological process" have muddied the waters considerably. For example, applying this approach to the Harvard Onco mouse, it appears that the animal itself could be unpatentable because although the initial steps of introducing the foreign DNA into the mouse oocyte could be considered a microbiological process, the subsequent steps involving mouse differentiation and reproduction would result in unpatentable products produced by an essentially biological process. In fact, under this analysis, it would be difficult to find any transgenic plant or animal patentable because the production of a differentiated life form always includes essentially biological processes. The Enlarged Court of Appeal in the European Patent Office has not yet clarified the parameters of the claims for transgenic plants and animals. Accordingly, our European associates recommend submitting a full set of claims initially for all aspects of the invention from the microbiological upwards.

The issue of support and proper claim scope in the field of genetic engineering has also caused some problems in the EPO. Claims in the following format have been accepted, i.e.,

A recombinant DNA molecule for use..., said recombinant DNA molecule comprising a DNA sequence selected from (a) specified DNA sequences; (b) DNA sequences which hybridize to any of the specified sequences and code for a defined polypeptide; and (c) DNA sequences which are degenerate as a result of the genetic code to the DNA sequences defined in (a) and (b) and which code for the defined polypeptide¹⁰.

Recognizing that there can be significant difficulties in defining microbiological entities precisely, where the DNA sequences of the material specified in the claim is not known, the following claim language has also been approved:

Plasmid [identifier], characterized in that it is obtainable from a culture of [ATCC deposit number], has a contour length of [specified] and a molecular length of about [specified] and in that it is not fragmented by [specified restriction endonucleases]..., but it is cleaved by [specified restriction endonucleases] into fragments [of specified lengths]¹¹.

The general standard for what is required to support a claim is that disclosure of an invention is only sufficient if the skilled person can reasonably expect that substantially all embodiments of a claimed invention which this skilled person would envisage on the basis of the corresponding disclosure and the relevant common knowledge can be put into practice with only exceptional failures being tolerated¹². Disclosure of limited ways of performing the invention can be considered to be sufficient within the meaning of Article 83 EPC if it allows the man skilled in the art to perform the invention in the whole range that it is claimed¹³. Whether this is done should be determined on the balance of probabilities and in opposition, the burden of proof being on the opponent¹⁴.

When claiming an amino acid sequence however, it has been made clear that the sequence must be set out correctly in the first instance¹⁵. This means that if the scientist provides an incorrect sequence which is essential to the invention, i.e. it is represented in the claims and particularly if it forms a part of the broad claim, amendment will not be allowed. The reason for this is that the change of a single amino acid can sometimes have a dramatic effect on the efficacy of the eventual end product.

Biotechnology patenting in the EPO, as in the U.S. Patent and Trademark Office, presents unique challenges. Issues and decisions concerning enablement and written description are quite similar. For example, recent EPO decisions suggest a conclusion that where the invention can be classified as a principle which is capable of general application, then a broad claim can be justified on the basis that the principle enables a broad range of applications. However, claims to biotechnology inventions are generally allowed only to that which is coterminous with the particular finding which has been made. Due to the unique exceptions to patentability concerning the morality and nature of the invention, patenting transgenic plants and animals in the EPO is a complex and uncertain process at present. However, given the great economic and social value of these types of inventions and demands from Europe's biotechnology business community it is likely that this will be continue to be an active area of debate.

1 The EPO members are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

2 Articles 52 and 53 of the EPO define the types of patentable subject matter. The requirements for patentability are similar to the U.S. requirements of novelty, utility and nonobviousness.

3 A first medical use claim is in the form of "compound X for use in treating Y". A second medical use or Swiss formulation claim is allowed in the form of "the use of compound X for the manufacture of a medicament for treatment of disease Y".

4 Article 53 of the EPO provides for these exceptions to patentability

5 See, for example, Plant Genetic Systems, T356/93.

6 Many EPO member states are also members of the European Union (EU). In an effort to achieve greater harmonization of national laws on the patenting of inventions with a biotechnological component, a Draft Directive on Legal Protection of Biotechnological Inventions is under consideration by the European Union. However, inventions such as Dolly the sheep produced by cloning, mice with human chromosomes and genetically engineered food are not addressed by the Directive.

7 Harvard Onco mouse, T19/90.

8 Article 53(b) provides that:

European patents shall not be granted in respect of: (a) inventions the publication or exploitation of which would be contrary to 'order public' or morality, provided that the exploitation shall not be deemed to be so contrary merely because it is prohibited by law or regulation in some or all of the

Contracting States; (b) plant or animal varieties or essentially biological processes for the production of plants or animals; this provision does not apply to microbiological processes or the products thereof.
9 Plant Genetic Systems, T356/93.

10 Biogen, T301/87

11 Hoechst, T162/86.

12 Unilever, T435/91.

13 In a recent decision, Evans Medical's Patent (Laddie, J. 16.1.98) decided under the EPC via the National British Courts, it is stated that: "A claim which covers a protein which does not exist and where a man in the art would not know, and there is no teaching of, how to make it is also insufficient".

14 Schering, T548/91.

15 Genentech, T923/92.