Scientific research and patent law: ethical and juridical relationship between them

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Abstract

Scientific research and patent law belong to two very different worlds, which made dificult that there are points of contact. While the underlying principles that authorize the granting of a patent (existence of a patentable invention, novelty, a inventive improve in the object or capacity in question and there industrial application) envisioned no conflicts were observed. The changes in patent law as a result of increasing market pressure has led to a transformation that disturbs the free movement of knowledge and scientific research itself; ethical issues of undoubted interest. The most significant notes of this process are described in this work as well as the most important conflicts that arose**.**

Keywords: Patents as topic-Ethics. Ownership-Inventions-Knowledge. Research-Intellectual property. Laws-Registered trademarks.

Resumen

Investigación científica y patentes: análisis ético-jurídico de sus relaciones

La investigación científica y el derecho de patentes pertenecen a dos mundos muy diferentes, lo que no imposibilitó que existan puntos de contacto. Mientras se observaron los principios liminares que autorizan el otorgamiento de una patente (existencia de una invención patentable, novedosa, con altura inventiva y aplicación industrial) no se vislumbraron conflictos. Los cambios operados en el derecho de patentes como fruto de una creciente presión de los mercados ha llevado a una transformación que perturba la libre circulación del conocimiento y la investigación científica en sí; temas de indudable interés ético. En este trabajo se describen las notas más significativas de este proceso, así como los conflictos más relevantes que se suscitaron.

Palabras-clave: Patentes como asunto-Ética. Propiedad-Invenciones-Conocimiento. Investigación-Propiedad intelectual. Leyes-Marcas registradas.

Resumo

Investigação científica e patentes: análise ético-jurídica de suas relações

A pesquisa científica e o direito de patentes pertencem a dois mundos muito diferentes, o que não impossibilitou que existam pontos de contato. Embora se tenha observado os princípios basilares que autorizam a concessão de uma patente (existência de invenção patenteável, inovadora, com cunho inventivo e aplicação industrial) não não se vislumbraram conflitos. As mudanças feitas no direito de patentes como fruto da crescente pressão do mercado, levou a uma transformação que perturba a livre circulação do conhecimento e da pesquisa científica em si; temas de indiscutível interesse ético. Neste trabalho se descrevem os aspectos mais significativos deste processo, assim como os conflitos mais relevantes que foram suscitados.

Palavras-chave: Patentes como assunto-Ética. Propriedade-Invenções-Conhecimento. Pesquisa-Propriedade intelectual. Leis-Marcas registradas.

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Declara não haver conflito de interesse.

Traditionally it was considered that the industrial property law moved in an eminently technical world to regulate the rights attributed to those who incorporated into society mechanical innovations, in the form of devices, instruments, equipment, facilities, etc. Later appeared the chemical-pharmaceutical industry. Far away were living beings, living matter, the genetic material that belonged to another world.

When modern biotechnology emerged and it was possible to appreciate the market value of biotechnology products and processes, the debate about the incorporation of living beings, their parts, reproduction material, to the right of industrial property arose. With different arguments - tested for the new realities - patent offices, courts and the laws were callously incorporating micro-organisms, plants, animals, biological material and human genetic, all of which led to consider a certain relationship between industrial property and ethical principles.

A perfect example of this, and the speed with which operated this change is the development process of the *European Directive on Protection of Biotechnological Innovations* (98/44C) [1]. In little more than two decades it took to be sanctioned, it went from a text that did not contain any mention of ethical to the finally approved Directive which dedicated about half of its content to the ethical issues posed by the admission of the matter and living beings to the world of industrial property.

Anyway, they insisted on not substantially modify the core principles of the discipline. The patent can be granted for inventions that have satisfied the objective requirements of patentability (being new, having some inventive step and industrial application or utility).

The observance of this scheme contributed to balancing the system: the patent holder benefits from the exploitation of the invention (production, marketing, exploitation, etc.) and at the same time society benefits by adding to its collection more knowledge, which will eventually provide the basis to other findings in the future.

While the dividing line between discovery (not patentable) and invention (patentable) remained, the functioning of the system allowed a certain degree of balance between interests that seemed to be opposing because of the diversity of purposes intended.

Now we are facing a scene that challenge that balance. Particularly from the exponential development of biotechnology and related sciences, the dividing line between invention and discovery seemed to have vanished. Patent law, as well as the jurisprudence - notes Pestre - were decisive here, widely extended the scope of implementation of patentability and constituted the privileged mean by which the commercial universe led to change the previous balances and make prevail the rule of commodification as the only effective [2].

This new situation redefines the objectives of industrial property: vector of dissemination of knowledge for the benefit of society or obstacle to its freedom of movement.

In this paper we intend to analyze from orbit of scientific research to the new role of industrial property, analysis naturally involving ethical and legal aspects of great social significance from the orbit of scientific research.

Protection of scientific research in patent law

Given that the exclusive rights granted to the patent beneficiary can interfere with scientific research, patent laws use three antidotes to save it, namely:

a) The exclusion of discoveries, while discovery belongs to the world of observation and not to the creation;

b) The exception of experimentation authorizing in certain cases the use of product or procedure patented for experimental purposes, without being penalized who uses it;

c) The existence of a grace period to patent, allowing to disclose the product or process to be patented for a limited time prior to the application, without losing the patentability.

Of these three antidotes, without a doubt, the first is the most important and is enshrined in the generality of the laws. The second raises doubts as to whether the exception allows the experimentation based *in* an invention or *with* an invention. The third, in turn, is accepted in some countries and in others not (v. gr. Europeans).

Changes in patent law

It is clear and does not need further development that industrial property rights in which the world of patents is based has undergone changes that threaten to destroy its bases of support. Cor-

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rea citing Dickson affirms that these changes did not happen by chance, but rather are based on the way in which scientific research is carried out in what has been called the economics of innovation [3].

The financing went on to become a decisive factor and the investor in a major player in the exploitation of research results. In this process - it has been noted - the most abstract knowledge becomes a financially visible and direct factor of production [4]. Research plans point in this new context to the marginalization of long-term concerns, with a reduction of heterodox and "free" research, a focus and a concentration on the "monetizable" domains.

The universities have become direct players of industrial development and increasingly abandon their suppliers nature of "open science" involved in patenting and licensing agreements [5]. Common union of public universities with private companies points to largely satisfy the interests and needs of these, such as: an early gain on research, catch it in early stages to avoid competition, block future research covering with patents the entire spectrum relating to research at issue, use patents as anti-competitive weapon.

The need to respond to these purposes increases the struggle for possession of patents, without much interest in its contents or its contribution to the progress of science and technology. At the global level the outcome of these battles for a greater ownership of the results of science was an enhancement of the practices of secrecy and a tendency to the formation of new monopolies on certain products and research.

Effects on the scientific research of changes in patent law

The changes in patent law have resulted in a set of practices that ultimately affect scientific research. We will refer to them.

The patentability in the early stages of research

The prevalence of economic competition over the technical aspects of inventions led to accelerate the time and apply for patents even when the alleged invention is in the initial stages, which naturally does not allow its specific use.

An invention - worth reiterate it once again - is the culmination of a creative process aimed at satisfying a technical problem of human interest. In Korea and in Japan the term "invention" refers to a highly advanced creation of technical ideas in which the laws of nature are used. In both cases, it is understood that this definition excludes the patentability from the laws of nature, mere discoveries, ideas which are not technical, solutions to problems that are impossible to solve, innovations that are not based on the laws of nature and innovations that are contrary to these laws [6]. I emphasize the phrase "*well advanced* ", implying the culmination of a creative process that, in agreement, is designed in stages.

Especially researches in the field of biology imply a substantial effort that may or may not lead to the verification of a hypothesis, or achieving success does not necessarily concrete into a patentable invention due to the lack of the extremes required by law for that to happen, being in any case a contribution of basic science. Today, the prevalence of the economics of innovation requires continuously new patents without the research reaching a useful or practical result. This is a phenomenon that has been properly studied in the field of biology.

Much of the knowledge produced in the area of biotechnology - as teached by Dal Paz and Denis Barbosa - has technical potential, but not immediate and direct. Strategically there is an interest from economic operators (not necessarily a public interest) in anticipating the appropriation of technology. For this reason they are tempted to patent biotechnological and biomolecular processes, in combination with DNA sequences that are related to it [7].

In a significant number of cases practices related to biotechnology are activities of science, technology and innovation in progress and of long maturation. The early patentability when only the first steps of the research process have been given can only satisfy business criteria of strategic reserve of market or creation of a pool of patents for purely commercial purposes, which is very negative for scientific research in general.

When it is patented in the early stages of research actually it is not being patented a technique created to solve a technical problem, but simply they are patenting knowledge - technical or scientific - that freely transferred and used without impediments that generates the patent could be useful to try or pursue other researches, and seeing their path blocked are not taken by other researchers so they do not become entangled in litigation.

The need to free dispose of "research tools" is referred to by Axel Kahn, a leading French scientist, in these terms: *an essential principle in this matter is to create the conditions that would render possible*

the invention. This involves preserving the scientific ideal and the necessary conditions for its realization, allowing the accumulation of knowledge and research tools, which must remain freely available for researchers to use them in new useful inventions. It tends to avoid an early monopoly of the knowledge too upstream of that continuum ranging from knowledge to the invention. These accumulated knowledge are necessary for the inventive activity to flourish [8].

The investigations are undertaken based on hypotheses that are testable with varying results. The conflict is alien to the world of science and consequently researchers prefer not to resort to the use of knowledge that are already blocked by patents. It is very instructive in this regard what happened to genomic research.

The patentability in the early stages of developing a research found in the offices of patents adequate support to block future developments by other researchers, by giving rights to the first to patent that clearly overstep the contribution made. To this we must add that almost all current doctrines show a bias toward initial "innovative" [9].

In this regard, the Board of Appeal of the European Patent Office (OEP) considers that the "inventor" can not be sanctioned and penalized because of the gaps in science in the domain that he is concerned and therefore the extension of the protection afforded by the patent should not be reduced to what it actually got [10]. In the event of patent based on an element of knowledge in a domain still imperfectly known, the protection in the view of the offices should include the hypothesis that the depositor would not have seen on their application [11].
The position of the offices about this regard is inexplicable. The Board of Technical Appeal of the OEP understands that if the claim is founded on what is actually described, the patented will not be provided with an effective protection. The extension of the protection conferred by the patent, extended to the full potential of the gene, make it possible to block the subsequent biomedical research [12]. We say that it is inexplicable because in the event that is supported the patentability of genes beyond the limits of the effectively described by the applicant, it would imply at the same time to support the protection of an incomplete research, as if the general principle was the one of the protection via patent and the exception the one of the free movement of knowledge.

The analysis of the policies of patentability generated in the field of genomics is very enlightening , a field that is and will be in the coming years so required by researchers, since once the human genome was sequenced, it has been opened related pathways that can lead to significant achievements in the etiology and cure of multiple diseases. In parallel with the first steps of sequencing a real competition took place between pharmaceutical companies or that were made for that only purpose in order to appropriate the genetic information as it was unveiled. Not only genes but partial sequences were patented, promoters, SNP's, etc. In a very short time a considerable part of the human genome was protected by patents. The number of patents granted was really impressive since they could be counted by thousands [13].

The position of the researchers from the very beginning was contrary to patentability. At the Bermuda meeting in February 1996 the scientists intended to be covered to avoid the stalking of the commercial sectors. There they agreed on two principles: 1) share the results of sequencing "as soon as possible" spreading the upper stretches of DNA to thousand base pairs and; 2) pledged to provide this information within 24 hours once they were obtained to the public database "Gen-Bank". The goal of the agreement was to prevent that the research centers establish a privileged position in the exploitation and control related to human sequences [14].

With the number and variety of patents granted to the human genome a tangle of patents was created, that although it contributed to monopolize the market by companies that earned extraordinary profits, from the point of view of scientific research it has been and remains too negative. Already in 1998, Heller and Eisenberg warned about the existence of the drawbacks of an excess of private rights accumulated and superimposed on genes and sequences. In their view this multiplication of owners on genomic research made it difficult to assembly the property rights needed for the development of an innovation [15].

A contentious issue is related to the need to use different "inventions" covered by patents in the same research. In genomics the investigations made by different laboratories are not independent from each other. The use of the genetic material patented by one of them (e.g. recipient or genetic markers) may be necessary for further investigations made by others. In the field of vaccines, it is highly unlikely that a single company may be owner of each of the components of the vaccine. To avoid further court proceedings it becomes necessary to obtain licenses, which naturally hinders the course of the investigation. The holder of patents on a "research tool"

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eventually claims his right to the invention lately made by that instrument [16].

In practice the need for a company or university laboratory of to use patented research tools will lead them to negotiate contractual licenses with the owners of those patents. In this case the possibility of further investigation will depend on the conditions under which the grant of the license is agreed [17]. In 1997 conflicts had already emerged between genomic companies, which foreshadowed for future strifes among those who sequenced the gene and those that linked it with a disease or biological function. Thus what happened between Millenium and Hoffman Laroche, on one hand; and Progenitor on the other, in relation to the leptin receptor gene [18].

In a study produced by the Nuffield Council on Bioethics it is noted that the way by which the patentability of DNA sequences that only obtain a primary utility as research tools affects to this:

- the cost of research may increase because the increase in granted patents will result in more licenses being required in the development of future research;
- the research would be hampered if the investigators were obliged to negotiate the use of genes and patented sequences first;
- a patent holder would retain the right to license to obtain maximum initial benefits or, if applicable, would license it exclusively to one or a limited number of licensees;
- the companies wishing to acquire the rights to several DNA sequences will decide not to develop therapeutic proteins or diagnostic test as a result of the cost of the required royalties.

Based on these considerations, the Council considered that the exercise of a monopoly on essential discoveries of genetic information accessible by routine methods, was highly undesirable [19]. In vegetable matter such is the range of claims that they may present in relation to a single component or character, that are frequent the cases where a single plant is the subject of multiple patents. In the case of the transgenic plants and products of agrobiotechnology, each and every one of the components and of the processes may be protected by intellectual property rights [20].

The research under secrecy and the restriction to scientific communications

If the knowledge, even the most abstract, becomes a commodity as it can be patented, the scientific research ends up adapting to it and undermining their purposes. Disclose the different steps of an investigation may be harmful to those who are funding it and expect to get immediate returns on their ownership, even in an unfinished stage. That is why practices alien to *ethos* of science have been imposed in an increasingly way. It applies both at company level and at the level of universities that have been linked with the commercial world to achieve revenues in the planned research.

In French universities practicing thesis "embargoed" is increasingly common. Such practices seem to be eminently secret and zealously controlled. While ignoring the scientific tradition of open communication between colleagues and of publications in scientific journals, congresses, etc., they are decisively detrimental for research, which thrives on exchanges of expertise and experiences [21].

The intensification of relations between public research and businesses, and the multiplication of research contracts that entails implied the generalization of the obligation of secrecy imposed by companies that finance the work. The extension of market principles led to public research laboratories to a retention of information strategy as well as to reduce academic publications. Today an important part of fundamental research leads directly to the patentability without knowing for certain the practical application, estimate of any patent protection [22]

The recourse to a systematic protection of research results necessarily entails a delay in being available to the scientific community. For the scientist publishing in a journal of basic research is imperative in which the outcome of the investigation is validated, since all the papers are submitted before their publication to the critical judgment of colleagues (refereed). This behavior can be observed in the field of free science only; proper science by patents escapes to the circuit of verification of the community and scientific press. The patent does not encourage the cooperation or the sharing of the progress, but rather the concealing of the partial results and the misinformation.

In short the mass introduction of the patent in the circuit of production of scientific knowledge is a barrier to their diffusion and promotes the behaviors of misinformation [23]. The invasion of investments and profits, basic figures from the business world, can intensify any tendency to keep and retain information [24].

Regarding the fundamental research Stiglitz believes that there are some relevant situations

where the costs of the strategy of a greater appropriation are high. This - he adds - is particularly the case of the fundamental research, because the benefits are extensive and diffuse and the interests to appropriate its production can significantly slow the overall system of innovations [25].

In the same vein Dominique Foray points out that a privatization based on patents necessarily harms other modes of scientific production - publications, conferences, etc. - given that the principle consists in not to disclose the result before it is protected by patents. To this should be added that most of these patents do not pass a serious examination according to traditional principles of industrial property right [26].

The weakening of the exclusion of discoveries

Through successive jurisprudential advances the extent of the discoveries excluded from protection became limited, in decisions that had the endorsement of most of the patent offices and with much debatable arguments, as evidenced by the central milestones which I will expose.

In the case of Antanamid in 07/28/77, the German Court of Patent Appeals laid down the doctrine that natural substances are still patentable. In principle - he said - even though the applicant had only made one discovery that was not limited to its application, he also provided a technical description of the preparation procedure of the substance involved. The applicant - argued the court - through the Antanamid finding in a type of mushroom had made only a discovery; but not only limited to the description of discovery, but also provided a technical description of the isolating procedure of the substance under consideration, it could access a patent. The patent granted in this case was to the product (the natural substance) as well as to the procedure for their preparation.

The principles of the judgment of Antanamid were confirmed and developed in the judgment *Lactobacillus bavaricus* in which it was stressed that the new microorganisms, even though they are present in nature had not been discovered earlier and technical intervention of man in order for it to be recognized and reproducibly obtained, was necessary.

In the Chakrabarty case the US Supreme Court recognized for the first time the patentability of a living being. In this case the most of the Court understood that *the requestor created a new bacterium with widely different characteristics of any other found in nature, also having a potential of significant utility. This discovery is not a work of nature, but of the researcher*, concluding that the bacterium is patentable under the terms of paragraph 101 of the law (as product) [27].

Instead of granting the patent to the procedure that allowed the functional modification of the bacterium, the declaration spread to patent "a new living being" (the product), which is absurd because the bacterium - even with altered functions - does not lose its original category, becoming a new species. In order to ratify its position the court *held that the patent law does not distinguish between living and inanimate objects, but between products of nature, living or not, and inventions produced by man* [28]. It takes a lot of imagination to conceive that the modified bacterium is a human invention, while there was no creation.

In Bergy case, the Federal Circuit Court of the United States admitted the patentability of a microorganism found in nature arguing that *nature and the commercial uses of biologically pure cultures of microorganisms are similar in practice to inanimate chemicals products, used as reagents, as raw material or as catalysts in industrial chemistry* . We see no meaningful distinction from the legal point of view - argued the court - between chemical reactors and living organisms per se used as chemical reagents [29].

In the Myriad Genetics case the Supreme Court of the United States admitted the patentability of the DNAc arguing that *the lab technician creates something new when processing* DNAc [30]. The DNAc conserves the exons from natural DNA, but is different from DNA from which is derived. In conclusion, *the DNAc is not a* product of nature *and is patentable under article 101* [31].

The Court based its decision on the following arguments: *The petitioners admitted that the DNAc differs from natural DNA in that the non-coding regions have been removed. They argue, however, that DNAc is not patentable because the nucleotide sequence is dictated by nature and not by the laboratory technician. This might be the case - noted the Court - but the lab technician undoubtedly creates something new when preparing DNAc. The DNAc conserves the exons from natural DNA, but is different from DNA which is derived.* As a result, the DNAc is not a "*product of nature*" and is patentable under Article 101.

What expresses this reasoning is that everything that has the human seal, despite how elementary the human intervention might appear, is

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patentable because it moves away from the natural world, which is what circumscribes what is excluded from patent protection. With this approach, the field of the patentable widens to absurd limits. The denoted decisions had great impact and the doctrine implicit in them was host by most patent offices. They illustrate to us about the state of the issue but big questions are still open.

Indeed, a substance does not lose its nature when isolated or prepared and cannot be accepted in any way that there is a human creation in such activity. Even though a living being is subjected to any alteration in its structure to be given a new function, continues to belong to the same biological taxon to integrate a new one. A microorganism belongs to the world of life and a chemical reagent to the inanimate world, and they cannot be treated in a similar way to establish its patentability. *The DNAc that retains the same genetic information than natural DNA, to which the noncoding parts were separated by known processes, does not imply a human creation which has the merit to be patented as a product* .

What it can be observed in these cases is that these are difficult reasonings to share, but ultimately point to justify the desired result: the patentability. It should be noted as a common element to all that the *human intervention*, no matter how decisive it is, constitutes sufficient grounds for separating the dividing line between discovery and patentable invention.

In this respect, Cassier notes that the operation consisting in isolate, manipulate and reproduce the natural effects is the very definition of the activity in scientific laboratories. The distinction between the work of discovering a natural substance and the invention of a device is thus deleted. All lab products born from the work of discovering them are potentially patentable, no matter how much they meet the traditional criteria of patentability [32] . Reviewing these decisions we would have to agree with Robert Laughlin, Nobel Prize in Physics, with respect to the expansion of patent law is usually covered by using technical language [33].

Originally the industrial property laws were intended to reward real inventions and stimulate the competition, forcing others to explore new paths of research, while protecting a certain patented object from the competition. The subsequent dilution of the integrity of the patent system unreasonably through the competition for the excessive protection, it not only stops the competition but also degrades the original purposes of the intellectual property and the credibility of the patent system [34].

The rupture of the dividing line between natural laws and "patentable inventions"

Often it is justified the grant of patents that don't claim a creative effort, arguing - especially in the biological field - that the dividing line between the invention and discovery is gone. This vision that seeks to justify the continued advancement of patentability on fields outside of its legal sphere encloses in the facts an undisguised intentionality to encourage the misappropriation of knowledge [35].

M. C. Tallacchini, an outstanding researcher in the legal field of biotechnology, understands that the risk is that the will of accelerating the progress of biotechnology can transform the patents in a kind of *fictio juris*. In some human material patents granted in the United States it can be found much more the legitimacy of the market than the recognition of an innovative and creative process [36] .

It is not questionable that a discovery may provide a basis for multiple inventions, as we have stated. What is questionable is that the patent is used to appropriate the fundamental basis of those findings, without introducing a qualified technical input.

In practice - they have noted - the lower courts and the United States Patent and Trademark Office (USTPO) have been too permissive in granting patents claiming obvious applications of newly discovered scientific principles or that effectively cover any practical use of the discovery and these patents have a negative impact on biomedical research and ultimately on public health. There are numerous cases where patents are granted on pseudo inventions that border the natural laws.

A case that has been widely covered by the specialized doctrine is the one that is derived from the discovery of a correlation between certain mutations of the BRCA1 gene and the susceptibility to breast cancer, which led to the granting of several patents which together encompass any diagnostic procedure for detecting it, as well as the gene itself, which resulted in several court decisions in the United States and the European Union, limiting its scope.

In the case of Metabolite Laboratories the patent granted is linked to the discovery made on the correlation between the total level of homocysteine in the human body and the deficiency of vitamin B [37] . Based on this discovery a patent was obtained which claims any method for detecting a deficiency of vitamin B, which comprises the following steps a) analyzing the homocysteine in the body fluid of the patients; b) correlating an observation of the total elevated homocysteine with a deficiency of vitamin B.

In a proceeding related to this patent the Federal Circuit Court of the United States stated that the patent had been infringed by the doctors who ordered homocysteine testing to their patients and used the results to the diagnosis of deficiency of vitamin B !!! [38]. Holman rightly considers that *the granted patent seemed to cross the line of non-patentable subject matter while excluding any practical use of a natural phenomenon* [39]. In the case of Classen Immunotherapies four patents based on the discovery that the variation in patterns of vaccination may lead to the risk of developing chronic autoimmune disorders were involved [40-43].

Granted patents, overall, claim methods for delimiting vaccination disorders based on the comparison of the incidence of immune system effects between two or more groups of subjects immunized at various times. A court, while resolving a dispute over the validity of the patent concluded that the correlation between the timing of vaccination and the risk of developing an immunological disorder is a natural phenomenon and what was claimed implied an indirect attempt to patent the idea that a link between the vaccination programs and chronic immune disorders exists. Following the Metabolite case, the patents in question sought to effectively cover any practical exploitation of a biological correlation now discovered, but pre-existing in nature.

In the Ariad Pharmaceuticals case the patent was based on a discovery made by a researcher of the transcription factor NF-Kb (nuclear factor Kapa B) of the central role played by the path of NF-kB in the expression of gene in a variety of contexts [44]. A holder's competitor company raised before the justice the invalidity of the patent due to the fact that it claims an impermissible way a principle of nature. Like the previous cases Ariad's patent seems to broadly cover any practical application of omnipresent discovery in the NF-kB path, claiming the use of drugs that inadvertently affect that way, but that develop without the specific intention to affect NF- kB.

Showing these judicial and administrative decisions Holman notes that these patents can serve as obstacles and disincentives for follow-up research and commercial development to transform the fundamental discoveries in potentially aimed life-saving technologies [39] .

Fifteen years ago, J. Barton warned of the risk that granting a very broad basic patents on fundamental research processes could slow down and complicate the subsequent investigation [9].

What should be criticized here is the attempt to obtain patents based on the simple application of a principle or a natural law without a real and true inventive contribution. This happens too often, creating problems to the research that instead of seeing open roads to travel finds legal impediments that discourage to use the open roads.

The granting of patents on inventions that come very close to the natural laws constitutes a clear abuse of law and show the disregard or in some cases the complicity of patent offices which while overlooking elementary examination criteria, become in fact a true agencies dispensing of undue privileges.

Final thoughts

The relationship between invention patents and scientific research is not a conflict in principle. If we look at the central principles received by national legal systems and by the Agreement on the Intellectual Property Right related to the Commerce (ADPIC) - the existence of a patentable invention which respects the objective requirements of patentability (novelty, inventive merit, industrial application or utility) - they can coexist without interference or damage.

The issue takes on a different connotation when - as it happens too often - the patentability of discoveries is admitted, patents are granted in the early stages of the research process or for natural laws. Here the damage to scientific activity is evident.

Today we can notice a discouraging picture regarding the number and quality of patents granted. Both patent offices and the courts observe an absurd permissibility, which does not measure the social consequences of their decisions. The patents inappropriately granted not only affect the competition - alien issue that concerns us - but also hinder the scientific research.

Jurisprudential criteria have been developed that lack the necessary regulatory endorsement but once launched they become dogmatic constructions that are repeated in all latitudes. In this picture - in a way perverse - we can see every day that a considerable part of the advances in basic research is reinforced by patents that create inexplicable barriers to the free movement of knowledge. To the growing pressures from industry are added in many

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cases those that are exercised by universities and state agencies, which forget the primacy of public interest. Scientific research requires a climate of freedom and security in a high point of its development which often gives rise to reasonable expectations for the future.

We are aware of the positive aspects that the relationship between the scientific research and the industry can generate, but for that to occur is neither necessary nor desirable that the foundations of the rights of industrial property are unaware, making the patents a title that only serves to negate the competition or the principles that inspired and inspire scientific research are altered. Any unjustified impediment to the development of it, implies at the same time an attack against society as a whole. It becomes necessary to take careful note of the problems that generates the unrestricted opening of the exclusive rights and that it emphasizes scientific research as a public good of dominant social interest.

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