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Publish or perish and patent or perish

TOMASZ TWARDOWSKI

Institute of Bioorganic Chemistry, Polish Academy of Sciences, Poznań, Poland
e-mail: twardows@ibch.poznan.pl

In the last century scientific research has been commercialized. Why? These are the reasons: scientific data are commercial goods and therefore they are products evaluated in terms of commercial value; scientific ideas are presented as commercial products supported by a concrete volume of cash money given by sponsors (state, company or foundation).

Research integrity and commercialization of science are combined with international system very well known as intellectual property rights and protected by law under sophisticated legislation system. Different names are used for the legislative needs, in Poland this is "Industrial property rights"; in Germany: "Patent Gesetz," or in Europe: European Patent Convention, EPC. Evidently the international harmonization is of critical value to protect the effects of researchers' work and to give the investors a chance for profit. Nevertheless when thinking about patenting we have to take into account several, other than financial, aspects like for example public perception of patenting of functional and engineered genes, living organisms (e.g. modified bacteria) and market value of innovations performed in multinationals corporations. Inventions involving basic research are being filed in different categories depending on the purpose e.g.: methods and preparations, food products, medical and/or cosmetic compositions, as well as different applications, including the novel structure and use of innovative chemical compounds as herbicides or stimulators in cultivation of plants.

The energy resources (labor and money) for patenting in scientific communities come from the system: scientists need several bibliometric values for the evaluation system in order to apply for grants, for their scientific carriers (consecutive scientific degrees) or for public recognition. From the point of view of a university professor (or younger researcher who wants to become a professor) patents do have several advantages: 1) the same data can be published twice (as patent and scientific publications) and 2) can be legally evaluated twice in their carrier. On the other hand a patent guarantees the monopolistic position of the patent owner (not the author) to collect royalties. Importantly, there is no way to commercialize scientific achievements without the protection of the intellectual property rights. However now approximately only one patent per thousand is being commercialized.

Public perception of science and social recognition of scientific achievements is very often presented by economists, as well as by journalists, as a transfer of science to public life, mostly as application to commercial products. It is relatively easy to indicate and to evaluate the number of domestic and international patents, as well as the number of commercialized patents. However, we should expect different measures for technical academies, for basic research and for humanities. Research integrity and commercialization of science are in this case in parallel. The future of biotechnology is clearly connected with the production of food, feed, biomaterials, bioenergy and rare components like biopharmaceuticals and enzymes. The perspectives and dangers of biotechnology and bioeconomy are covered and inseparably connected with the protection of intellectual property rights. In conclusion I would like to state the following: there is no way to avoid patenting of the innovations done by modern science since bioeconomy is the key to our future. However, we all have the rights and privileges of free choice. In any case the education is a key to understand and accept the innovative technology and modern science.

In this issue of *BioTechnologia* we present an overview of patents and their value in terms of innovations in modern economy as well as in science (A. Tyczewska).

Table 1. A representation of patents granted and patent applications filed by IBC PAS

	Patent number	Description	Assignee	Inventor(s)	Publication date
1	US/8404660 B2 PL/216370	The subjects of the present invention are the method of preparation of 4-furfurylcytosine and/or its derivatives, its use in the manufacture of anti-aging compositions and an anti- aging composition. As 4-furfurylcytosine and/or its derivatives possesses a series of biological properties it might be use as a composition having excellent anti-aging effect to prevent the sagging of skin and loss of luster and to improve sufficiently its aesthetic appearance without significantly change the growth rate and the total growth ability of the skin. Optimal methods of manufacturing this compound, while at the same time obtaining the highest possible process efficiency, with particular emphasis on its utility in the pharmaceutical and cosmetic industries are presented	Institute of Bioorganic Chemistry PAS	J. Barciszewski W. Markiewicz E. Wyszko K. Rolle M. Chmielewski M. Nowak E. Adamska M. Markiewicz	PL: 21. 08. 2013 US: 18. 12. 2012
2	PL/212696 EP/2255002	The subject of the present invention is a method to inhibit ribonuclease Dicer, ribonuclease Dicer inhibitor, and use of RNA aptamers to inhibit ribonuclease Dicer. More specifically, this solution relates to using RNA aptamers as ribonuclease Dicer inhibitors that acts upon the competition basis (aptamers as competence inhibitors), use of RNA aptamers as allosteric ribonuclease Dicer inhibitors, and use of RNA aptamers as selective inhibitors of emergence of the selected miRNAs	Institute of Bioorganic Chemistry PAS	M. Figlerowicz A. Tyczewska T. Twardowski A. Szopa A. Kietrys	PL: 18. 05. 2012 EP: 06. 03. 2012
3	PL 217694 EP 2630152 US Application US 2013/0316970 A1	The object of the invention are nucleotide analogues, antiviral pro-nucleotides, a use of nucleotide analogues and pharmaceutical composition, a phosphorylating agent for synthesis of nucleotide analogue, and a method of synthesis of nucleotide analogue. More precisely, the invention applies to the new group of nucleotide analogues and their use in partial or complete inhibition of human immunodeficiency virus (HIV)	Institute of Bioorganic Chemistry PAS National Medicines Institute Warszawa	A. Kraszewski J. Romanowska A. Szymańska-Michalak M. Sobkowski J. Boryski A. Lipniacki A. Piasek	15. 06. 2009

4	P 403341 PCT/IB 2014/060188	The object of the invention are hammerhead ribozymes directed against the sequence of miR-21 and/or miR-21 precursors, having the ability to specifically cleave miR-21 and/or miR- 21 precursors, and wherein they have acatalytic core with a sequence as shown in SEQ ID No 1. The invention also relates to a composition comprising such ribozymes, a therapeutic agent comprising them, a use of such ribozymes and a method of selective cleavage of miR-21 and/or 1 miR-21 precursors employing such ribozymes	Institute of Bioorganic Chemistry PAS	A. Belter K. Rolle M. Piwecka P. Sosińska M. Naskręt-Barciszewska A. Fedoruk-Wyszomirska	27. 03. 2013
5	P 398 211 22. 02. 2012 EP 13711481.5 US 14/373,447	The present invention relates to an RNA oligomer, methods for regulating' a miRNA production process and RNA oligomers used as miRNA production process regulators. More precisely, the present invention relates to use of RNA oligomers disrupting a pre-miRNA structure as miRNA production process regulators. Oligomer interactions with a miRNA precursor (pre-miRNA) change the precursor's secondary and tertiary structure. In consequence, the pre-miRNA is not specifically recognised and cleaved by the Dicer ribonuclease, and the specific miRNA is not produced	Institute of Bioorganic Chemistry PAS	A. Kurzyńska-Kokorniak N. Koralewska A. Tyczewska T. Twardowski M. Figlerowicz	22. 02. 2012
6	P 401 324 EP 13795005.1 US 14/385,500	The present invention relates to a Lyme disease vaccine, a genetic construct, recombinant protein, method for genetic construct design, method for vaccine delivery, method for recombinant proteins delivery, use of recombinant proteins in the production of Lyme disease vaccine. In particular, the method concerns the use of TROSPA and TROSPA-Salp15 recombinant proteins derived from castor bean tick (*Ixodes riccinus*) as a component of Lyme disease vaccine for animals. The antibodies present in blood of an immunized vertebrate directed against the TROSPA proteins considerably reduce the chance of infecting new ticks by blocking or hindering the interaction of TROSPA protein with OspA protein of Borrelia burgdorferi sensu lato. The interaction is crucial in the process of the spirochete entering a tick. The antibodies directed against the TROSPA-Salp15 protein protect vertebrates from infection on the stage of Borellia diffusion by destroying their protective coating formed at the surface as a result of the interaction between the Salp15 tick protein and OspC spirochete protein. The vaccine based on TROSPA tick proteins and TROSPA-Salp15 proteins may be used independently or together with the OspA recombinant proteins and OspC protein of Borrelia burgdorferi sensu lato	Institute of Bioorganic Chemistry PAS	A. Urbanowicz M. Figlerowicz D. Lewandowski (PCT, Euro-PCT, US)	22. 10. 2012

We also present an opinion of dr Ewa Waszkowska, the Examiner in the Patent Examining Department of the Polish Patent Office, on gene patents. Last, but not least, we present some patents granted and patent application filed for inventions obtained during basic research science in the Institute of Bioorganic Chemistry of Polish Academy of Sciences in Poznań, Poland IBC PAS (an overview in Table 1). We also wish to encourage other scientific research facilities to present, on the pages of *BioTechnologia*, their achievements on the field of patenting.