Ancona, September 22, 2023

Intellectual Property and Biotechnology

(A comparison between the EPO and USPTO practice)

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MAR.BRE
safe idea

European Patent Office (EPO)	United States Patent and trademark Office (USPTO)
- **European Patent Convention** (EPC) (Current version: 17th edition / November 2020) - **Guidelines for Examination** (Current version: March 2023) - **London Agreement** (in force since 1 May 2008) -  **UNITARY PATENT SYSTEM**	- **United States Code (USC) Section 35** - **Leahy–Smith America Invents Act** (AIA) (September 2011), amendment to 35 USC - **Manual of Patent Examining Procedure (MPEP)** (latest version: February 2023)

NOVELTY

Art. 54 EPC – Novelty for EPO: 1st and further medical use give novelty to substances or compositions

*(1) An invention shall be considered to be new if it **does not form part of the state of the art**.*
*(2) The state of the art shall be held to comprise **everything made available to the public** by means of a **written or oral** description, by **use**, or in any other way, **before the date of filing** of the European patent application.*
*(3) Additionally, the content of European patent applications as filed, the dates of filing of which are **prior to the date referred to in paragraph 2** and which were **published on or after that date**, shall be considered as comprised in the state of the art.*

*(4) Paragraphs 2 and 3 shall not exclude the patentability of any **substance or composition**, comprised in the state of the art, for use in a method referred to in Article 53(c), provided that its **use** for any such method is not comprised in the state of the art.*

*(5) (5) Paragraphs 2 and 3 shall also not exclude the patentability of any substance or composition referred to in paragraph 4 for any specific use in a method referred to in Article 53(c) [see below], **provided that such use is not comprised in the state of the art**.*

Example:

1. A messenger ribonucleic acid (mRNA) comprising an open reading frame (ORF) that encodes a SARS-CoV-2 spike (S) protein having a double proline stabilizing mutation.

WO2021154763A1, filed on 26.01.2021, Assignee: ModernaTX, Inc.

Assessment of novelty

D1 *** pages 497, 504, Table 3 *** discloses the COVID19 disease caused by SARS-CoV2, its pandemic potential, the lack of treatment therefor, and its relation to SARS and MERS.

D2 discloses the genome of SARS-CoV2

D3 *** para. 148-150, 166, 227, 343, 351, 372-374, 382, 407-456, 584-5 discloses mRNA vaccine directed against MERS coronavirus, GC optim 227, spike protein + stabilization by mutation para. 148-150, Table X1, li delivery para. 407-456, 584-586, heterologous 5' and 3' UTR para. 343. histone stem-loop para 351..., woodchuck hepatitis VLP para. 166

D4 *** Figure 1b, c *** discloses double proline stabilizing mutation in be spike protein

D5 *** para 43, 44, 51, 154-158, 270-273, 389-406, 915, claims 154-15 same applicant, discloses mRNA vaccine coding for beta coronavirus s LNP packaging, same LNP compounds (see claim 25) as in present application

Disclosure of the application

1 mRNA vaccine against SARS-CoV2

Re: medical use

Re: medical use

2 Claims 37-45 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 39.1(iv) / 67.1(iv) PCT. The patentability can be dependent upon the formulation of the claims. The EPO, for example, does not recognise as patentable claims to the use of a compound in medical treatment, but may allow claims to a product, in particular substances or compositions for use in a first or further medical treatment. Patentability, in particular novelty and inventive step, of said claims has been assessed on the basis of a purpose-limited product claim taking into account the alleged effects of the substance or composition.

3 The presently available prior art does not disclose an mRNA coding for a SARS CoV2 spike protein having a double proline stabilizing mutation. The claims are hence novel.

The presently available prior art does not disclose an mRNA coding for a SARS CoV2 spike protein having a double proline stabilizing mutation. The claims are hence novel.

Written Opinion of the International Searching Authority

WO2021154763A1, filed on 26.01.2021, Assignee: ModernaTx, Inc.

The corresponding EP application EP4096710A1 and US application US2023108894A1 are presently abandoned.

35 U.S.C. § 102: Novelty for US 1/3

(a) NOVELTY; PRIOR ART.

*A person shall be entitled to a patent **unless**:*

***(1)** the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public **before the effective filing date of the claimed invention**; or*

***(2)** the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and **was effectively filed before the effective filing date of the claimed invention**.*

35 U.S.C. § 102: Novelty for US 2/3

(b) EXCEPTIONS

(1) DISCLOSURES MADE 1 YEAR OR LESS BEFORE THE EFFECTIVE FILING DATE OF THE CLAIMED INVENTION.—*A disclosure made **1 year or less** before the effective **filing date** of a claimed invention shall **not** be prior art to the claimed invention under subsection (a)(1) if—*

***(A)** the disclosure was made **by the inventor or joint inventor or by another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor**; or*

***(B)** the subject matter disclosed had, before such disclosure, been publicly disclosed **by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor**.*

35 U.S.C. § 102: Novelty for US 3/3

(b) Exceptions (follows)

(2) Disclosures appearing in applications and patents.

*A disclosure shall **not** be prior art to a claimed invention under subsection (a)(2) if*

> ***(A)** the subject matter disclosed was obtained directly or indirectly **from the inventor or a joint inventor**;*
> ***(B)** the subject matter disclosed had, before such subject matter was effectively filed under subsection (a)(2), been publicly disclosed **by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor**; or*
> ***(C)** the subject matter disclosed and the claimed invention, not later than the effective filing date of the claimed invention, were owned **by the same person or subject to an obligation of assignment to the same person**.*

No grace period before the EPO!

- **Grace periods as defined under 35 U.S.C. 102(b) are not contemplated before the EPO;**

- **(US) applicants must therefore be careful on any disclosure occurring before the date of filing, as it may be prejudicial to patentability in other countries/regions, e.g. Europe;**

- **The only exceptions before the EPO are defined under Art. 55 EPC – however, those exceptions are quite specific and rarely applied.**

EXCLUSIONS TO PATENTABILITY

SECOND AND FURTHER MEDICAL USE

Art. 53(3) EPC – Methods of treatment / diagnostic methods are not patentable before the EPO

*European patents shall **not** be granted in respect of:*

[…]

***(c) methods for treatment of the human or animal body** by surgery or therapy and **diagnostic methods** practised on the human or animal body; this provision **shall not apply to products, in particular substances or compositions, for use in any of these methods**.*

35 U.S. Code § 101 - Inventions patentable

Whoever invents or discovers any new and useful ***process, machine, manufacture, or composition of matter, or any new and useful improvement thereof****, may obtain a patent therefor, subject to the conditions and requirements of this title.*

2106 MPEP Patent Subject Matter Eligibility

Second, the claimed invention also must qualify as ***patent-eligible subject matter****, i.e., the claim must not be directed to a judicial exception unless the claim as a whole includes additional limitations amounting to significantly more than the exception. The judicial exceptions (also called "judicially recognized exceptions" or simply "exceptions") are subject matter that the courts have found to be outside of, or exceptions to, the* ***four statutory categories of invention****, and are limited to* ***abstract ideas, laws of nature and natural phenomena (including products of nature)****. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 216, 110 USPQ2d 1976, 1980 (2014) (citing Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. 576, 589, 106 USPQ2d 1972, 1979 (2013). See* ***MPEP § 2106.04*** *for detailed information on the judicial exceptions.*

HOW TO WRITE Second and further medical use claims EPO 1/4

«Swiss-type claims»	
e.g.: «*Use of compound X in the manufacture of medicament Y for treatment of disease Z*» **G5/83 (Headnote):** I. A European Patent with claims directed to the **use** may **not** be granted for the use of a substance or composition for the **treatment** of the human or animal body by therapy. II. A European patent **may be granted** with claims directed to the use of a substance or composition **for the manufacture of a medicament for a specified new and inventive therapeutic application**.	**Swiss-type claims are now obsolete.**

HOW TO WRITE Second and further medical use claims EPO 2/4

G2/08 (Headnote):

The questions referred to the Enlarged Board of Appeal are answered as follows:
Question 1: Where it is already known to use a medicament to treat an illness, Article 54(5) EPC does not exclude that this medicament be patented ***for use in a different treatment by therapy of the same illness****.*
Question 2: Such patenting is also not excluded where a ***dosage regime*** *is the only feature claimed which is not comprised in the state of the art.*
Question 3: Where the subject matter of a claim is rendered novel only ***by a new therapeutic use of a medicament****, such claim may* ***no longer have the format of a so called Swiss-type claim as instituted by decision G5/83****.*
A time-limit of three months after publication of the present decision in the Official Journal of the European Patent Office is set in order that future applicants comply with this new situation.

HOW TO WRITE Second and further medical use claims EPO 3/4

Example of wording for a second (or further) medical use claim:

1. An IL-18 antagonist for use in the treatment and/or prevention of atopic dermatitis or a related condition in a subject in need thereof.

WO2022091010, filed on 29.10.2021, priority 29.10.202 , Assignee: NovartisAG

HOW TO WRITE Second and further medical use claims EPO 4/4

Description, paragraph bridging pages 2-3 (medical applications for IL-18):

Apart from its physiological role, IL-18 has been shown to mediate a variety of autoimmune, such as Crohn's disease, psoriasis, rheumatoid arthritis, multiple sclerosis and cardiovascular diseases (Braddock et al. (2004) Expert Opin Biol Ther; 4(6):847-860), and inflammatory diseases. It has been demonstrated that IL-18 expression is up-regulated in several autoimmune diseases, such as chronic obstructive pulmonary disease (COPD) (Imaoka et al. (2008) Eur Respir; J31:287-297), idiopathic pulmonary fibrosis (IPF) (Kitasato et al. (2004) Am J Resp Cell Mol Biol; 31:619-625), macrophage activation syndrome (MAS) (Dinarello and Kaplanski (2005) Expert Rev Clin Immunol; 1(4): 619-632), adult onset Still's disease (AOSD) (Arlet JB et al. (2006) Ann Rheum Dis 65(12):1596-601) and systemic juvenile idiopathic arthritis (SJIA) (Akashi et al. (1994) Br J Haematol; 87(2):243-50). Serum IL-18 levels have been shown to be increased in AD patients, and to correlate with disease severity (Thijs et al. (2015) Clin Exp Allergy 45: 698-701, Zedan et al. (2015) J Clin Diagn Res 9: WC01-05, Gohar et al. (2017) Egypt J Immunol 24: 9-22). IL-18 was shown to be overexpressed in the epidermis of pediatric AD participants and associated with AD disease activity (McAleer et al. (2019) Br J Dermatol 180: 586-596, Hulshof et al. (2019) Br J Dermatol 180: 621-630).

WO2022091010, filed on 29.10.2021, priority 29.10.202 , Assignee: NovartisAG

Medical claims for US are WRITTEN differently to obtain a similar protection

- 35 U.S.C. § 101 does **not** contemplate «use» among the listed **claim categories** (namely: ***process, machine, manufacture or composition of matter***).

- **2173.05(q) MPEP** – Use claims: *In view of the split of authority as discussed above, the most appropriate course of action would be to reject a* «use» *claim under alternative grounds based on 35 U.S.C. 101 and 112*.

- Therefore, according to the USPTO practice, a potential «use» claim should be rather drafted as directed to a **process**, e.g. reading along the following lines *«a process comprising administering a composition comprising compound X to a human in amount effective for the treatment of disease Y»*.

INVENTIVE STEP/ NON-OBVIOUSNESS

An invention must be inventive

Art. 56 EPC – Inventive Step

*An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is **not obvious to a person skilled in the art**.*

*If the state of the art also includes documents within the meaning of Article 54, paragraph 3, these documents **shall not be considered** in deciding whether there has been an inventive step.*

In Italy novelty and a lower level if inventiveness are sufficient to obtain a Utility Model – however, rarely applicable in the field of life science, pharmacology or the like

- *10 years of protection*
- *Less expensive and not substantial examination* – **note: the absence of a substantial examination is at the same time a limit.**
- *Only apparatus claims, no method claims*
- *Also France, Spain, China, Germany accept utility models* – **however, the requirements and protection may differ.** **Example: in Germany, it is possible to obtain substantial examination for a utility model patent upon request and payment of the examination fee.**

EPO: Inventive Step assessment 1/3

Art. 56 EPC – Inventive Step

The relevance of prior art under Art. 54(3) EPC in the assessment of novelty but **not** in the assessment of inventive step prevents a too restrictive approach.

When compared to the assessment of novelty, the assessment of inventive step is inevitably **more subjective in nature**.

Definition of the *person having ordinary skills* in the art.

In general, different than the US Courts (see below) European courts are **unlikely** to grant ***substantial creativity*** to the person having ordinary skills in the art.

EPO: Inventive Step assessment 2/3

Art. 56 EPC – Inventive Step

Assessment of inventive step in Europe. The so called **«problem-solution approach»**.

This approach involves three subsequent steps:

1) Defining the **closest prior art**;

2) Defining the distinguishing features of the claimed solution over the closest prior art and determining the **objective technical problem** that is solved through the invention;

3) Based on the closest prior art, and in view of the objective technical problem, defining whether the claimed solution would have been **obvious**, **for the one having ordinary skills in the art**, **at the date of filing**.

EPO: Inventive Step assessment 3/3

Art. 56 EPC – Inventive Step

According to the **EPO Guidelines** (**G.VII, 5.1**)

*The closest prior art is that which in one single reference discloses the combination of features which constitutes **the most promising starting point** for a development leading to the invention. In selecting the closest prior art, the first consideration is that it must be directed to a **similar purpose or effect** as the invention or **at least belong to the same or a closely related technical field** as the claimed invention. In practice, the closest prior art is generally that which corresponds to a **similar use and requires the minimum of structural and functional modification**s to arrive at the claimed invention (*see **T 606/89***).*

[…]

*The closest prior art must be assessed from the skilled person's point of view **on the day before the filing or priority date** valid for the claimed invention.*

Assessment of inventive step

1. A messenger ribonucleic acid (mRNA) comprising an open reading frame (ORF) that encodes a SARS-CoV-2 spike (S) protein having a double proline stabilizing mutation.

Re: inventive step

4 All claims lack inventive step. D5 could be taken as closest prior art. D5 discloses mRNA vaccines comprising mRNA coding for beta-coronovirus spike protein. The difference to claim 1 is that it refers to SARS-CoV2, and to a double proline stabilizing mutation. The technical problem would be: the provision an alternative mRNA (vaccine). Motivation to solve the problem

derives from the pandemic potential of SARS-CoV2 (D1, page 504) and the severity of the COVID19 disease (D1, Table 3). The sequence of the SARS-CoV2 genome was available (see D2). Furthermore, methods for preparing an mRNA vaccine were known (see D3, D5). Of note, MERS coronavirus is closely related to SARS-CoV2 (see D1, page 497). It was therefore obvious to apply the teaching of D3 to the technical problem. This includes the structure of the engineered mRNA and measures to stabilize it (UTR addition), but also the double proline mutation which is analogous to the mutation in the S protein of the MERS coronavirus disclosed in D3 (V1060P, K1061P, see D3, para. 148-150, and Table X1, cf. D4 Figure 1b, c). The technical effects of the mRNA constructs tested in the examples and figures, such as immunogenicity and protective effect in laboratory animals is in line with the expectations in view of the prior art. Consequently, all claims insofar as they are novel, lack inventive step.

Written Opinion of the International Searching Authority

WO2021154763A1, filed on 26.01.2021, Assignee: ModernaTX, Inc.

USPTO: Assessment of inventive step 1/5

35 U.S.C. § 103

A patent for a claimed invention may ***not*** *be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention* ***as a whole*** *would have been* ***obvious before the effective filing date*** *of the claimed invention to a* ***person having ordinary skill in the art*** *to which the claimed invention pertains.* ***Patentability shall not be negated by the manner in which the invention was made****.*

USPTO: Assessment of inventive step 2/5

…brief clarification…

The second sentence states that patentability as to this requirement is not to be negatived by the ***manner in which the invention was made***, that is, it is immaterial whether it resulted from **long toil and experimentation** or from a **flash of genius**.

USPTO: Assessment of inventive step 3/5

2141 MPEP - **Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103**

Teaching-Suggestion-Motivation (TSM) Test

As reiterated by the Supreme Court in ***KSR International Co. v. Teleflex Inc****. (KSR),* 550 U.S. 398, 82 USPQ2d 1385 (2007) the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in ***Graham v. John Deere Co.****,* 383 U.S. 1, 148 USPQ 459 (1966).

Obviousness is a question of law based on **underlying factual inquiries**. The factual inquiries enunciated by the Court are as follows:

(A) Determining the scope and content of the prior art;
(B) Ascertaining the differences between the claimed invention and the prior art; and
(C) Resolving the level of ordinary skill in the pertinent art.

USPTO: Assessment of inventive step 4/5

2141 MPEP- Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103

«Secondary considerations»

Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel.

*Such evidence, sometimes referred to as "**secondary considerations**," may include **evidence of commercial success, long-felt but unsolved needs, failure of others, and unexpected results**.*

*The evidence **may be included in the specification as filed**, accompany the application on filing, or be provided in a timely manner at some other point during the prosecution.*

The weight to be given any objective evidence is determined on a case-by-case basis.

USPTO: Assessment of inventive step 5/5

<u>2141 MPEP</u> - Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103

«The person having ordinary skills in the art»

The person of ordinary skill in the art is a hypothetical person ***who is presumed to have known the relevant art at the relevant time****.*

Factors that may be considered in determining the level of ordinary skill in the art may include: ***(1)*** *"type of problems encountered in the art;"* ***(2)*** *"prior art solutions to those problems;"* ***(3)*** *"rapidity with which innovations are made;"* ***(4)*** *"sophistication of the technology; and"* ***(5)*** *"educational level of active workers in the field."*

"A person of ordinary skill in the art is ***<u>also a person of ordinary creativity</u>****, not an automaton."* ***KSR****, 550 U.S. at 421, 82 USPQ2d at 1397. "[I]n many cases a person of ordinary skill will be able to* ***fit the teachings of multiple patents together like pieces of a puzzle****."Id. at 420, 82 USPQ2d at 1397. Office personnel may also take into account "the* ***inferences and creative steps*** *that a person of ordinary skill in the art would employ."Id. at 418, 82 USPQ2d at 1396.*

Key difference USPTO- EPO (Inventive Step)

- In *KSR* the Supreme Court gave more credit to the ***ability and creativity*** of the skilled person (instead of a rigid application of the TSM test);

- In particular, the Court held that the application of **«obvious to try considerations»** should <u>not</u> be precluded when assessing non-obviousness;

- As mentioned, the EPO practice does **<u>not</u>** contemplate any reference to the ***ability and creativity*** of the skilled person.

Experimental evidence could play a significant role in order to prove the presence of an inventive step, especially with respect to inventions in the field of **life science, pharmaceuticals or even medical engineering**.

Therefore, when possible, it is important to merge the available **experimental data** into the description, as this would not only be useful for the sake of clarity and sufficient disclosure (see below), but also in the perspective of providing solid evidence in support of inventive step.

In general, the way an application is drafted may play a significant role in the course of the examination proceedings. The preparation of a complete, well-drafted text is therefore of the utmost importance.

US: DUTY OF DISCLOSURE

INFORMATION DISCLOSURE STATEMENTS

USPTO: duty of candor and good faith 1/5

37 CFR § 1.56 - Duty to disclose information material to patentability.

Each individual associated with the filing and prosecution of a patent application has ***a duty of candor and good faith*** *in dealing with the Office, which includes a duty to disclose to the Office* ***all information known to that individual to be material to patentability****.*

The duty to disclose information exists with respect ***to each pending claim*** *until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned.*

USPTO: duty of candor and good faith 2/5

…In particular:

The Office encourages applicants to carefully examine:

(1) *Prior art cited in search reports of a* ***foreign patent office*** *in a counterpart application, and*

(2) *The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.*

FORM PTO-1449/A and B (modified PTO/SB/08)	APPLICATION NO.: 17/277,452	ATTY. DOCKET NO.: M1378.70104US02
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	FILING DATE: March 18, 2021	CONFIRMATION NO.: 1030
	FIRST NAMED INVENTOR: Edward J. Hennessy	
Sheet 1 of 19	GROUP ART UNIT: 1633	EXAMINER: Not Yet Assigned

U.S. PATENT DOCUMENTS

Examiner's Initials #	Cite No.	U.S. Patent Document Number	U.S. Patent Document Kind Code	Name of Patentee or Applicant of Cited Document	Date of Publication or Issue of Cited Document MM-DD-YYYY
		5,898,077	A	Takahara et al.	04-27-1999
		6,652,886		Ahn et al.	11-25-2003
		6,696,038		Mahala et al.	02-24-2004
		7,268,120		Horton et al.	09-11-2007
		7,371,404		Panzner et al.	05-13-2008
		7,943,168		Schlesinger et al.	05-17-2011
		8,058,069		Yaworski et al.	11-15-2011
		8,158,601		Chen et al.	04-17-2012
		8,420,123		Troiano et al.	04-16-2013
		8,440,614		Castor	05-14-2013
		8,450,298		Mahon et al.	05-28-2013
		8,460,696		Slobodkin et al.	06-11-2013
		8,460,709		Ausborn et al.	06-11-2013
		8,568,784		Lillard et al.	10-29-2013
		8,569,256	B2	Heyes et al.	10-29-2013
		8,580,297		Essler et al.	11-12-2013
		8,642,076		Manoharan et al.	02-04-2014
		8,652,487	B2	Maldonado	02-18-2014
		8,691,750	B2	Constien et al.	04-08-2014
		8,697,098		Perumal et al.	04-15-2014
		8,709,483		Farokhzad et al.	04-29-2014
		8,710,200		Schrum et al.	04-29-2014
		8,715,736		Sachdeva et al.	05-06-2014
		8,734,832		O'Hagan et al.	05-27-2014
		8,734,846		Ali et al.	05-27-2014
		8,754,062		De Fougerolles et al.	06-17-2014
		8,822,663		Schrum et al.	09-02-2014
		8,999,380		Bancel et al.	04-07-2015
		9,221,891		Bancel et al.	12-29-2015
		9,283,287	A1	Bancel et al.	03-15-2016

EXAMINER:	DATE CONSIDERED:

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

Example of IDS

US2022047518A1, filed on 10.09.2018, Assignee: ModernaTX, Inc.

USPTO: duty of candor and good faith 4/5

- In principle, when a Court finds **inequitable conduct** for any claim in a patent, **the entire patent becomes unenforceable** – also, any finding of inequitable conduct in a patent belonging to a patent family, may lead to other, related patents of the same family becoming unenforceable as well;

- To prevent the risk of such a heavy outcome, applicants in the US disclose **more and more documents** to make sure meeting the disclosure requirement;

- That is, the number of disclosed patents usually results **enormous**;

- Further than being burdensome for the applicant, this also contributes to significantly **slow down** the examination proceedings

USPTO: duty of candor and good faith 5/5

…follows

- The Courts have tried to **reduce** the number of filed references by making a claim of inequitable conduct **harder to prove**, in particular requiring:

  1) an intent on the part of the applicant («specific intent to deceive»), and

  2) the reference in question to be material to patentability.

- The applicant may also show that he/she failed to disclose a reference for **reasons other than attempting to deceive** the Office.

- However, the number of disclosed documents still remains quite significant.

- **Before the EPO, there is no duty to disclose prior art references that are known to the applicant.**

INDUSTRIAL APPLICATION

Industrial application should be apparent from the description 1/4

Art. 57 EPC – Industrial application

*An invention shall be considered as susceptible of industrial application if it can be **made or used in any kind of industry, including agriculture**.*

Guidelines F.II, 4.9

*The description should indicate explicitly the way in which the invention is capable of exploitation in industry, if this is not obvious from the description or from the nature of the invention. […] in most cases, the way in which the invention can be exploited in industry will be self-evident […] but there may be a few instances, e.g. in relation to **methods of testing**, where the manner of industrial exploitation is not apparent and must therefore **be explicitly indicated**.*

*Also, in relation to certain **biotechnological inventions**, i.e. **sequences and partial sequences of genes**, the industrial application is **not self-evident**. The industrial application of such sequences must be **disclosed in the patent application**.*

Industrial application – sequences and partial sequences of genes 2/4

See also **Guidelines G.III, 4**

[…] *In relation to* ***sequences and partial sequences of genes****, this general requirement is given specific form in that the industrial application of a sequence or a partial sequence of a gene* ***must be disclosed*** *in the patent application. A mere nucleic acid sequence without indication of a function is* ***not*** *a patentable invention (EU Dir. 98/44/EC, rec. 23). In cases where a sequence or partial sequence of a gene is used to* ***produce a protein or a part of a protein****, it is necessary to* ***specify which protein or part of a protein is produced and what function this protein or part of a protein performs****. Alternatively, when a nucleotide sequence is not used to produce a protein or part of a protein,* ***the function to be indicated could e.g. be that the sequence exhibits a certain transcription promoter activity***.

Assessment of industrial applicability 3/4

1. A recombinant meganuclease that recognizes and cleaves at a recognition sequence comprising SEQ ID NO: 3, wherein said recombinant meganuclease comprises a first subunit and a second subunit, wherein said first subunit binds to a first recognition half-site of said recognition sequence and comprises:

   (a) an amino acid sequence having at least 85% sequence identity to residues 198-344 of any one of SEQ ID NOs: 8-18; and
   (b) a first hypervariable (HVR1) region consisting of residues 215-270 of any one of SEQ ID NOs: 8-18;

   and wherein said second subunit binds to a second recognition half-site of said recognition sequence and comprises:

   (i) an amino acid sequence having at least 85% sequence identity to residues 7-153 of any one of SEQ ID NOs: 8-18; and
   (ii) a second hypervariable (HVR2) region consisting of residues 24-79 of any one of SEQ ID NOs: 8-18.

[0013] The present invention provides recombinant meganucleases that are engineered to recognize and cleave recognition sequences found within residues 93-208 of the human T cell receptor (TCR) alpha constant region gene (SEQ ID NO:1). Such meganuclease are useful for disrupting the TCR alpha constant region gene and, consequently, disrupting the expression and/or function of the cell surface TCR. Therefore, the meganucleases of the invention have utility in immunotherapy, including cancer immunotherapy. Meganuclease cleavage can disrupt gene function either by the mutagenic action of non-homologous end joining or by promoting the introduction of an exogenous polynucleotide into the gene via homologous recombination. In some embodiments, the introduced exogenous polynucleotide comprises a nucleic acid sequence encoding a chimeric antigen receptor, such that the meganuclease is useful for generating an allogeneic CAR T cell that lacks an endogenous TCR.

EP3359660B1, filed on 05.10.2016, priority: 05.10.2015 and 19.02.2016, Assignee: PREC BIOSCIENCES, INC.

Assessment of industrial applicability 4/4

1. A composition comprising lipid nanoparticles (LNPs) dispersed in an aqueous phase, wherein the LNPs comprise a cationically ionizable lipid and RNA; the aqueous phase comprises a buffer system comprising a buffer substance and a monovalent anion, the buffer substance being selected from the group consisting of tris(hydroxymethyl)aminomethane (Tris) and its protonated form, bis(2-hydroxyethyl)amino-tris(hydroxymethyl)methane (Bis-Tris-methane) and its protonated form, and triethanolamine (TEA) and its protonated form, and the monovalent anion being selected from the group consisting of chloride, acetate, glycolate, lactate, the anion of morpholinoethanesulfonic acid (MES), the anion of 3-(N-morpholino)propanesulfonic acid (MOPS), and the anion of 2-[4-(2-hydroxyethyl)piperazin-1-yl]ethanesulfonic acid (HEPES); the concentration of the buffer substance in the composition is at most about 25 mM; and the aqueous phase is substantially free of inorganic phosphate anions, substantially free of citrate anions, and substantially free of anions of ethylenediaminetetraacetic acid (EDTA).

4 Industrial applicability

The subject-matter of claims 1-90 is industrially applicable in the sense of Article 33(4) PCT.

Claims 91 and 92 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 39.1(iv) / 67.1(iv) PCT.

The patentability can be dependent upon the formulation of the claims. The EPO, for example, does not recognise as patentable claims to the use of a compound in medical treatment, but may allow claims to a product, in particular substances or compositions for use in a first or further medical treatment.

Written Opinion of the International Searching Authority

WO2022101470A1, filed on 15.11.2021 (see file for all claimed priorities) Assignee: BIONTECH SE

CLARITY of the CLAIMS

The claims must be clear and concise 1/6

Art. 84 EPC – Clarity

*The claims shall define the matter for which protection is sought. They shall be **clear** and **concise** and be **supported by the description**.*

NOTE:

- Art. 84 EPC defines three important requirements, namely **clarity, conciseness and support in the description**.

- It is highly recommendable to keep this in mind while drafting a patent application in order to prevent objections and/or provide solid grounds for persuasive amendments/arguments in response to possible objections in the course of the examination proceedings.

The claim language must be clear 2/6

Guidelines F.IV, 4.1

[…] *The clarity of the claims is of the* ***utmost importance*** *in view of their function in defining the matter for which protection is sought. Therefore, the* ***meaning of the terms*** *of a claim must, as far as possible, be clear for the person skilled in the art* ***from the wording of the claim alone***.

How to prevent clarity issues 3/6

To prevent clarity objections, it is important to:

- avoid the use of terms that have no **universally recognized meaning in the technical field of reference**, e.g. only belonging to laboratory jargon or the like;

- avoid the use of **relative or indefinite terms** or expressions that may **generate doubt regarding the subject-matter for which protection is sought** (e.g. «for example», «such as» and equivalents thereof);

- make sure that the claimed subject-matter is defined in a way that can be **clearly and unambiguously understood** (from the perspective of the one having ordinary skills in the art) by relying **only** on the claim language, and that no **essential features** are missing;

- make sure that all the features that are comprised in the claims are **duly supported** by the specification.

Assessment of clarity 4/6

1. A messenger ribonucleic acid (mRNA) comprising an open reading frame (ORF) that encodes a SARS-CoV-2 spike (S) protein having a double proline stabilizing mutation.

Re Item VIII

Certain observations on the international application

The term in claim 1, *"double proline stabilizing mutation"* is vague. Furthermore, it refers to a desideratum, rather than providing the technical features causing the described effect, i.e., the position of the prolines in the S protein sequence.

WO2021154763A1, filed on 26.01.2021, Assignee: ModernaTX, Inc.

Written Opinion of the International Searching Authority

Assessment of clarity 5/6

2. The amorphous reduced graphene oxide (rGO) film according to claim 1, which shows a X-ray diffraction spectra in which a peak at 11 ± 0.5, σ = 4, degrees 2 theta measured in an X-ray diffractometer with CuKα radiation (1.540598 Å) characteristic of non-reduced graphene oxide is substantially absent

1 Clarity (Article 84 EPC)

The application does not meet the requirements of Article 84 EPC, because claims 2 - 9 and 11 are not clear.

2.1 In claim 2, the term "substantially" is relative, vague and unclear.

Search Opinion enclosed to the European Search Report

EP3702327, filed on 27.02.2019, Assignee: Institucio Catalana de Recerca i Estudis Avancats ICREA et al

Assessment of clarity 6/6

4. The amorphous reduced graphene oxide (rGO) film according to any of the claims 1 to 3, which is capable, when implemented in an electrode with a diameter of about 25 micrometers, of providing a charge injection limit (CIL) from 2 to 10 mC/cm^2, and/or an impedance of 10 to 100 kΩ at a frequency of 1kHz in an electrolyte-based system.

2.3 Claim 4 reads: "which is capable, when implemented in an electrode with a diameter of about 25 micrometers, of providing a charge injection limit (CIL) from 2 to 10 mC/cm^2 , and/or an impedance of 10 to 100 kQ at a frequency of 1 kHz in an electrolyte-based system."

Thus, the claim does not meet the requirements of Article 84 EPC in that the matter for which protection is sought is not defined. The claim attempts to define the subject-matter in terms of the result to be achieved. Such a definition is only allowable under the conditions elaborated in the Guidelines F-IV, 4.10. In this instance, however, such a formulation is not allowable because it appears possible to define the subject-matter in more concrete terms, viz. in terms of how the effect is to be achieved.

Search Opinion enclosed to the European Search Report

EP3702327, filed on 27.02.2019, Assignee: Institucio Catalana de Recerca i Estudis Avancats ICREA et al

Clarity according to the USPTO practice

35 U.S.C. § 112(b)

b) CONCLUSION.—*The specification shall conclude with one or more claims particularly* ***pointing out and distinctly claiming*** *the subject matter which the inventor or a joint inventor regards as the invention*.

2173 MPEP - Claims Must Particularly Point Out and Distinctly Claim the Invention

*In patent examining parlance, the claim language must be "**definite**" to comply with 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph. Conversely, a claim that does not comply with this requirement of 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph is "**indefinite**."*

Requirement for the DESCRIPTION

ENABLEMENT, SUFFICIENT DISCLOSURE

«BEST MODE»

An invention must be sufficiently described 1/5

Art. 83 EPC – Disclosure of the invention

*The European patent application shall disclose the invention in a manner **sufficiently clear and complete** for it to be carried out by a person skilled in the art.*

Guidelines F.III, 1

*A **detailed description** of **at least one way** of carrying out the invention must be given. Since the application is addressed to the person skilled in the art, it is **neither necessary nor desirable that details of well-known ancillary features are given**, but the description must disclose any feature **essential** for carrying out the invention in sufficient detail to render it apparent to the skilled person **how to put the invention into practice**. A **single example** may suffice, but where the claims cover a broad field, the application is not usually regarded as satisfying the requirements of Art. 83 unless the description gives a number of examples or describes alternative embodiments or variations extending over the area protected by the claims. However, regard must be had to the facts and evidence of the particular case.*

An invention must be sufficiently described 2/5

…follows

Guidelines F.III, 1

*With regard to Art. 83, an objection of lack of sufficient disclosure presupposes that there are **serious doubts**, substantiated by verifiable facts (see T 409/91 and T 694/92). If the examining division is able, under the particular circumstances, to make out a reasoned case that the application lacks sufficient disclosure, the onus of establishing that the invention may be **performed and repeated over substantially the whole of the claimed range** lies with the applicant (see F-III, 4).*

*For the requirements of Art. 83 and of Rule 42(1)(c) and Rule 42(1)(e) to be fully satisfied, it is necessary that the invention is described not only in terms of its structure **but also in terms of its function**, unless the functions of the various parts are **immediately apparent**. Indeed, in some technical fields (e.g. computers), a clear description of function may be much more appropriate than an over-detailed description of structure.*

Example:

The examination is being carried out on the **following application documents**

Description, Pages

1-54	as published

Claims, Numbers

1-13	filed in electronic form on	31-07-2020

Drawings, Sheets

1/18-18/18	as published

The set of claims presently on file seems to comply with the requirements of the EPC. The applicant is requested to bring the description in conformity with the present set of claims, keeping in mind that the application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed, Article 123(2) EPC.

Third office action from the EPO, dated 15.01.2021

EP3294871A1, filed on 12.05.2016, priority 12.05.2015, Assignee: Platod

Claim 1 (on file at the the time of the 3rd office action)

1. An ex vivo method for producing platelets from megakaryocytes, said method comprising:

(a) providing a fluidic device comprising a production chamber including at least one channel delimited by (i) non-porous walls, (ii) one inlet opening at one end and (iii) one outlet opening at the other end;

(b) introducing a suspension of cells comprising megakaryocytes or their fragments into the inlet opening of the channel;

(c) subjecting said suspension to a flow from the inlet to the outlet of said channel, under a shear rate suitable for elongation and fragmentation of the megakaryocyte and platelet release in said channel,

(d) collecting platelets at the outlet of the channel,

wherein at least one megakaryocyte modulator compound is added to said suspension of cells, and said megakaryocyte modulator is selected from the group consisting of:

i. an inhibitor of the Rho/ROCK pathway,

ii. an inhibitor of the MLCK pathway,

iii. an inhibitor of the sirtuin pathway,

iv. an inhibitor of NMM II ATPase,

v. microtubule organizing regulators,

vi. an inhibitor of cytoskeletal signaling, and

vii. an inhibitor of matrix metalloproteinase.

EP3294871A1, filed on 12.05.2016, priority 12.05.2015, Assignee: Platod

Assessment of sufficient disclosure 5/5

Applicant had been advised that the claims on file complied with the requirements of the EPC.

Unfortunately this opinion has to revised.

The following objection is put forward:

Clarity (Art. 84 EPC) and sufficiency of disclosure (Art. 83 EPC)

Claim 1 contains a list of inhibitors and regulators generally mentioned without specifying which compounds of each category are useful to perform the invention.

The allowability of such general terms under Art. 83 and 84 EPC depends on whether all of the following conditions are met.

(a) specific compounds fulfilling the function are part of the common general knowledge being known for example from readily available prior art documents or being disclosed in the application in a plausible manner.

(b) the function can be verified by tests or procedures adequately specified in the description or known to the skilled person and which do not require undue experimentation and

(c) the entire contents of the patent application unambiguously shows that the function is causal for the solution of the problem underlying the invention so that it is reasonably clear that not only the examples in the application but any other compounds with the stated function may be used and what they might be.

Only if all of the conditions (a)-(c) are fulfilled the requirement of Art. 83 and 84 EPC are considered to be met.

Moreover, for each of the targets of the inhibitors/regulators as embraced by the claims it has to be clearly identifiable which function has to be tested and how this is linked to the therapeutic effect at issue. In particular, it has to be plausible that each of the embraced active agents achieves the therapeutic effect at issue (T 1079/08 and T1642/06).

In this case it is not plausible that all possible inhibitors/regulators encompassed by the claims will serve the purpose.

The claims should be limited according to what is credible based on the description, examples and common knowledge.

Fourth office action from the EPO, dated 13.06.2022

EP3294871A1, filed on 12.05.2016, priority 12.05.2015, Assignee: Platod

Description requirements before USPTO

35 U.S.C. § 112(a)

(a) **In General.—***The specification shall contain a* ***written description*** *of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to* ***enable any person skilled in the art*** *to which it pertains, or with which it is most nearly connected,* ***to make and use the same****, and shall set forth the* ***best mode*** *contemplated by the inventor or joint inventor of carrying out the invention*.

That is, the specification must fulfil three distinct requirements:

1) **Written description**
2) **Enablement**
3) **Best mode**

«BEST MODE»

In the USA, the applicant **must** disclose the **«best mode»** of practicing the invention.

Such «best mode» is determined by the inventor **at the date of filing** and must be sufficient to enable a person of ordinary skills in the art to practice said best mode.

In principle, this requirement is aimed at preventing the applicant from keeping the one that is considered the best mode to practice the invention secret from the public.

The «best mode» **remains a patentability requirement** also after the AIA. However, the ***approach changed*** for the purpose of defenses in patent validity or infringement proceedings. In particular, a lack of «best mode» in a patent specification **may no longer result in a claim being cancelled, held unforceable or held invalid** (see 35 U.S.C 282 «*The following shall be defenses in any action involving the* ***validity or infringement of a patent*** *and shall be pleaded […]* ***(3)*** *Invalidity of the patent or any claim in suit for failure to comply with—****(A)*** *any requirement of section 112,* ***except that the failure to disclose the best mode shall not be a basis on which any claim of a patent may be canceled or held invalid or otherwise unenforceable*** *[…].*»

Sufficiency of disclosure

- The written description requirements serves to show in **sufficient detail** that the inventor was in **actual possession** of the invention **at the date of filing**. Also, and even more, written description serves to **limit the scope of any claims** in a first application or in any future amendments to those claims or application claiming priority from the first application.

- Similar to Europe, enablement requires that the patent disclosure might be **sufficiently detailed** to allow a person having ordinary skills in the art to practice the claimed invention. **The full scope of the claimed invention must be enabled**.

- As outlined under **2164.01(a) MPEP** *There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to:*

(A) The breadth of the claims;
(B) The nature of the invention;
(C) The state of the prior art;
(D) The level of one of ordinary skill;
(E) The level of predictability in the art;
(F) The amount of direction provided by the inventor;
(G) The existence of working examples; and
(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

In Europe, the applicant is <u>not</u> required to expressly disclose the «best mode» of practicing the invention.

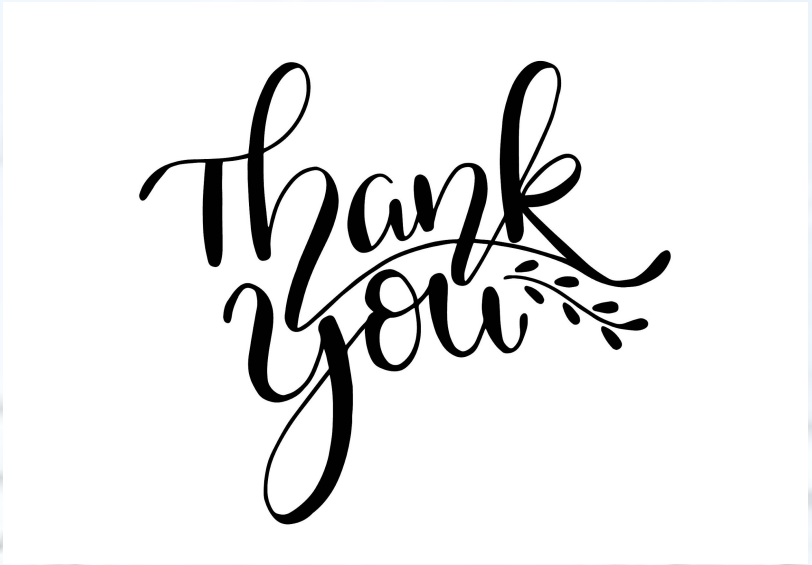
…SOME OBSERVATIONS AND USEFUL TIPS:

- Objections in terms of insufficient disclosure may be tricky and sometimes **very difficult to overcome**, especially when the description is actually defective.

- Again, this draws the attention on the importance of drafting a **clear and complete patent application**.

- In the field of **life science**, for example, the provision of **experimental evidence and data** could be of utmost importance.

- Not last, drafting of a clear and complete text could be very important in case of **subsequent amendments** to the claims and/or when claiming **priority** or filing a **divisional application**. This even more applies before the EPO, which adopts a **particularly strict approach**, requiring an **almost literal** support.



…ANY QUESTIONS?

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