Commissioner=s Decision #1323
Décision du Commissaire #1323

TOPIC: B20, B22, C00, G00
SUJET: B20, B22, C00, G00

Application No. : 2,308,623
Demande n^{o}. : 2,308,623

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,308,623 having been rejected under subsection 30(3) of the *Patent Rules*, has consequently been reviewed in accordance with subsection 30(6) of the *Patent Rules* by the Patent Appeal Board and the Commissioner of Patents. The findings of the Board and the decision of the Commissioner are as follows:

Agent for the Applicant:

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INTRODUCTION

[1] This decision deals with a review of the rejection of patent application no. 2,308,623.

[2] The Applicant is The New York Blood Center, Inc., the inventor is Marion E. Reid and the invention is entitled AMETHOD OF MAKING MONOCLONAL ANTIBODIES USING POLYMORPHIC TRANSGENIC ANIMALS.@

BACKGROUND

[3] The rejected application relates to a method for making antibodies specific to a single form of a polymorphic protein. The method comprises the use of transgenic animals that express different forms of a human protein known as the ADuffy@ protein. The different forms are known as the AFy^{a}@ and the AFy^{b}@ polymorphs and occur naturally on the surface of red blood cells. Once immunized with the Fy^{b} polymorph, a transgenic animal expressing the Duffy protein Fy^{a} should produce antibodies specific for the epitope peculiar to the Fy^{b} polymorph, and vice versa. This is because the transgenic animal=s immune system has been rendered tolerant to the Fy^{a} polymorph but not to the unique epitope peculiar to the Fy^{b} polymorph. Therefore, only the unique epitope is recognized as foreign and any antibodies produced would have a pre-defined specificity and would be able to discriminate between the two polymorphs. Such antibodies would be useful in pretransfusion blood testing.

[4] Prior to the filing of the present application, it was not possible to produce monoclonal antibodies capable of discriminating between the two polymorphic forms of the ADuffy@ protein using the established protocols. Although it was possible to prepare antisera that were specific for either polymorph, it was only possible to do so by using human sera B a fact that raised issues of quality control and biohazard containment. The disclosed methods allow for the production of very specific anti-sera in animals other than humans and also allow for the production of monoclonal antibodies to either polymorph.

PROSECUTION HISTORY

[5] The subject application was filed on November 14, 1997 and the examination was requested on October 2, 2002. The Examiner in charge of the application wrote two reports and subsequently issued a Final Action on December 20, 2007. In the Final Action, the Examiner rejected the application, finding all the claims to be broader in scope than the teaching of the description, contrary to section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[6] In the June 11, 2008 response to the Final Action, the Applicant did not make any amendments to the application, and respectfully traversed the Examiner=s arguments. According to the Examiner, the Applicant=s reply to the Final Action did not overcome the defects identified in the Final Action. Consequently, a Summary of Reasons was forwarded to the Patent Appeal Board and a copy was sent to the Applicant on February 19, 2009. The Applicant provided further written submissions in a letter dated March 25, 2009.

[7] The Applicant declined an invitation from the Board for an opportunity to be heard and did not make any further submissions. Therefore, the Board reviewed the rejection taking into account the existing Office records.

CLAIMS AT ISSUE

[8] The application contains product claims 5 and 6, and method claims 1-4 and 7-11. All claims are at issue. Claims 1, 5, 6 and 7 are representative:

> 1. A method of making an antibody, comprising: constructing a first transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding one human Duffy protein polymorph of either Fy^a or Fy^b and whose somatic cells express either the Fy^a or Fy^b polymorph encoded by the polynucleotide; constructing a second transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding the human Duffy protein polymorph Fy^a or Fy^b which is not contained in said first transgenic mouse and whose somatic cells express either the Fy^a or Fy^b human Duffy protein polymorph not expressed in said first transgenic mouse, wherein said second transgenic mouse is syngeneic to said first transgenic mouse; immunizing said first transgenic mouse with cells from said second transgenic mouse to induce an immune response in said first transgenic mouse, wherein a lymphoid cell of said first transgenic mouse produce an antibody specific for an epitope of the human Duffy protein polymorph expressed by the somatic cells of said second transgenic mouse; and isolating the antibody.
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> 5. A hybridoma cell that produces antibodies specific to one human Duffy protein polymorph of either Fy^a or Fy^b, prepared by a method comprising: constructing a first transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding one human Duffy protein polymorph of either Fy^a or Fy^b and whose somatic cells express either the Fy^a or Fy^b polymorph encoded by the polynucleotide; constructing a second transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding the human Duffy protein polymorph Fy^a or Fy^b which is not contained in said first transgenic mouse and whose somatic cells express either the Fy^a or Fy^b human Duffy protein polymorph not expressed in said first transgenic mouse, wherein said second transgenic mouse is syngeneic to said first transgenic mouse; immunizing said first transgenic mouse with cells from said second transgenic mouse to induce an immune response in said first transgenic mouse, wherein the lymphocytes of said first transgenic mouse produce an antibody specific for an epitope of the human Duffy protein polymorph expressed by the somatic cells of said second transgenic mouse; isolating from said first transgenic mouse a lymphoid cell which produces said antibody; and fusing said antibody-producing lymphoid cell with an immortal cell to provide a hybridoma cell that produces antibodies specific to one of the human Duffy protein polymorphs Fy^a or Fy^b.
>
> 6. An antibody specific to one human Duffy protein polymorph of either Fy^a or Fy^b, prepared by a method comprising: constructing a first transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding one human Duffy protein polymorph of either Fy^a or Fy^b and whose somatic cells express either the Fy^a or Fy^b polymorph encoded by the polynucleotide; constructing a second transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding the human Duffy protein polymorph Fy^a or Fy^b which is not contained in said first transgenic mouse and whose somatic cells express either the Fy^a or Fy^b human Duffy protein polymorph not expressed in said first transgenic mouse, wherein said second transgenic mouse is
> syngeneic to said first transgenic mouse; immunizing said first transgenic mouse with cells from said second transgenic mouse to induce an immune response in said first transgenic mouse, wherein the lymphocytes of said first transgenic mouse produce an antibody specific for an epitope of the human Duffy protein polymorph expressed by the somatic cells of said second transgenic mouse; isolating said antibody.

> 7. A method of making an antibody, comprising: constructing a transgenic mouse whose somatic and germ cells comprise a polynucleotide sequence encoding one human Duffy protein polymorph of either Fy^a or Fy^b and whose somatic cells express either the Fy^a or Fy^b polymorph encoded by the polynucleotide; immunizing said transgenic mouse with the human Duffy protein polymorph of either Fy^a or Fy^b which is not expressed by said transgenic mouse to induce an immune response in said transgenic mouse, wherein a lymphoid cell of said transgenic mouse produces an antibody specific for an epitope of the human Duffy protein polymorph not expressed by said transgenic mouse; and isolating the antibody.

THE ISSUES

[9] Having regard to the Final Action, the arguments submitted in response to the Final Action, the Summary of Reasons and Applicant=s submissions received on March 25, 2009, the Board is faced with two questions:

> (1) Given that the utility of the claimed methods had not been demonstrated as of the filing date, do the method claims go beyond the limits of a sound prediction?
>
> (2) Is the disclosure sufficient such that the product claims do not exceed what has been described and enabled by the specification?

RELEVANT LEGAL AUTHORITIES AND PRINCIPLES

[10] In relation to the first question, the nature of the alleged defect also brings into play the question of the utility of the invention, even if not explicitly stated as such in the Final Action. The requirement that an invention be useful, or have utility, is found in section 2 of the Act:

> Ainvention@ means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter;

[11] According to the test set out in *Apotex Inc. v. Wellcome Foundation Ltd.*, 2002 SCC 77, (*Wellcome*), an invention that relies on a sound prediction of utility must satisfy three requirements:

> (1) there must be a factual basis for the prediction;
> (2) the inventor must have at the date of the patent application an articulable and Asound@ line of reasoning from which the desired result can be inferred from the factual basis; and
> (3) there must be proper disclosure.

[12] The relevant date for determining the soundness of a prediction is not later than the filing date (see *Aventis Pharma Inc. v. Apotex Inc.*, 2005 FC 1283, 43 C.P.R. (4th) 161 at para.164; aff'd on this point 2006 FCA 64, 46 C.P.R. (4th) 401 at para. 30).

[13] The second question relates more to the requirements of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[14] Section 84 of the *Patent Rules* reads as follows:

> The claims shall be clear and concise and shall be fully supported by the description

> independently of any document referred to in the description.

and subsection 27(3) of the *Patent Act* reads as follows:

> The specification of an invention must:
>
> (*a*) correctly and fully describe the invention and its operation or use as contemplated by the inventor;
>
> (*b*) set out clearly the various steps in a process, or the method of constructing, making, compounding or using a machine, manufacture or composition of matter, in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it pertains, or with which it is most closely connected, to make, construct, compound or use it;
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> (*c*) in the case of a machine, explain the principle of the machine and the best mode in which the inventor has contemplated the application of that principle; and
>
> (*d*) in the case of a process, explain the necessary sequence, if any, of the various steps, so as to distinguish the invention from other inventions.

[15] Sufficiency of disclosure primarily relates to two questions that emphasize paragraphs 27(3)(*a*) and 27(3)(*b*) of the *Patent Act* (see *Consolboard v. MacMillam Bloedel*, [1981] 1 S.C.R. 504 at 526, 56 C.P.R. (2d) 145, at p.157): What is the invention? How does it work? With respect to each question the description must be correct and full in order that when the period of the monopoly has expired the public will be able, having only the specification, to make the same successful use of the invention as the inventor could at the time of his application and this, without having to display inventive ingenuity or undertake undue experimentation.

[16] Both questions at issue in this appeal (see paragraph [9]) relate to disclosure requirements. Subsequent to the issuance of the Final Action, the Federal Court of Appeal has indicated that the disclosure requirements as they relate to sound prediction, and as they relate to other aspects of proper disclosure, should be assessed separately (*Eli Lilly Canada Inc. v. Novopharm Limited*, 2010 FCA 197 at para. 120).

ANALYSIS AND FINDINGS

Sound prediction with respect to the claimed methods

[17] The first issue concerns the soundness of the Applicant=s prediction for the claimed methods only. No question arose in the Final Action with regard to the predicted utility of the products claimed in claims 5 and 6 (i.e., anti-Fy^a or anti-Fy^b antibodies and hybridomas capable of producing monoclonal antibodies).

[18] The following excerpt from the Final Action outlines, in part, the Examiner=s position with respect to the lack of sound prediction for the claimed methods:

> Because applicant has neither produced antibodies or hybridomas a person skilled in the art has no basis to predict that the method of said claims will generate antibodies directed at epitopes that are specific to either Fya or Fyb polymorph of the Duffy protein.

[19] The basis for the rejection rests in a concern that the transgenic animals immunized in accordance with the claimed methods will likely not react in the manner predicted. In light of Office practice at the date of the Final Action, the Examiner viewed the defect strictly as arising from the lack of exemplary support (i.e., no example in the disclosure establishing that a monoclonal antibody had been successfully produced using the claimed method). It follows that the Examiner=s assessment of the factual basis does not go beyond the absence of a successful demonstration of the claimed methods. Consequently, the Examiner did not provide any evidence of inutility nor a reasoned argument as to why it is not soundly predictable that the method would produce the defined antibodies. While the absence of the disclosure of even a single embodiment of the invention that actually worked is a relevant fact, it is not the sole consideration.

[20] The Applicant addressed the Examiner=s arguments in its response to the Final Action and in the submissions dated March 25, 2009. In summary the Applicant submitted the following:

- Based on *Re Institut Pasteur* (1995), 76 C.P.R. (3d) 206, Commissioner=s Decision No.1206 (*Pasteur*), post-filing evidence can be used to confirm that the invention, as described in the application when filed, was indeed operable.

- The Examiner did not provide any evidence that the claimed method of making an antibody was not sound when the application was filed, a position supported by the post-filing evidence provided by the inventor that clearly shows that methods described are sound, reasonable and yield the claimed results.

- The present method claims are based on a sound prediction and said claims do not go beyond the limits within which the prediction remains sound.

[24] Where the promised utility of an invention is not established by demonstration at the filing date, after-the-fact confirmation of the utility of a purported invention is not enough to support a predicted but not demonstrated utility; the Applicant=s argument to the contrary was specifically rejected by the Supreme Court of Canada in *Wellcome* at paras. 46 and 83:

> Unless the inventor is in a position to establish utility <u>as of the time the patent is applied for</u>, on the basis of either demonstration or sound prediction, the Commissioner Aby law@ is required to refuse the patent.
>
> ...
>
> The public is entitled to accurate and meaningful teaching in exchange for suffering the patent monopoly. The patent claims must be supported by the disclosure. <u>Speculation, even if it afterwards proves justified, does not provide valid consideration</u>. [Emphasis added]

[25] Thus, the fact that the method has been successfully used after the filing date to produce antibodies specific for the polymorph Fy^a is of no assistance in determining the soundness of the

prediction at the filing date.

[26] The specification promises that cross-immunizing transgenic animals expressing the Duffy protein Fy^a with Fy^b (or cells expressing Fy^b) will produce antibodies specific to the Fy^b form and vice versa.

[27] In order for the subject matter of claims 1 to 4 and 7 to 11 to successfully pass the test for sound prediction, the specification must provide a proper disclosure such that the person skilled in the art, given that disclosure, could have soundly predicted that the encompassed methods would produce the desired antibodies when practised.

[28] The relevant facts with regard to the production of antibodies specific for the polymorph Fy^a or Fy^b, as disclosed in the specification, include the following:

(1) All previous attempts to produce antibodies specific for the Fy^a or Fy^b Duffy protein polymorph using human red blood cells, enriched Duffy proteins or peptides as immunogens had failed.

(2) The immune system of a transgenic mouse expressing a given polymorphic alloantigen is tolerant to said alloantigen.

(3) The immune system of an individual expressing one particular Duffy protein polymorph is tolerant to donor red blood cells expressing the same polymorph but it produces an undesirable antibody response against the donor red blood cells expressing the other (i.e., the blood of Fy^a and Fy^b individuals is not compatible). Therefore, the human immune system is naturally capable of differentiating between the Fy^a and Fy^b Duffy protein polymorphs.

(4) The successful production of a transgenic mouse that expresses the Fy^b polymorph is exemplified in the specification. Serological analysis also indicated that, in the Fy^b transgenic mouse, the Fy^b polymorph was Afolded onto the mouse [red blood cell] membrane preserving its native (i.e., human) conformational structure and antigenic sites@ (see page 15, lines 24-26).

(5) There is no technical limitation to the use of a transgenic mouse expressing an alloantigen for the production of specific hybridoma and antibodies using the well-known techniques of antibody and hybridoma preparation, beyond the well-established hindered capacity of the mouse immune system to produce antibodies against self -antigens, including against the transgenically expressed alloantigen.

(6) The specification does not disclose the successful performance of a method, in its entirety, that falls within the scope of the claims. No exemplary antibodies are disclosed that would indicate at least one method, when actually performed, worked.

[29] According to the Applicant=s submission, a line of reasoning can be found at page 12, line 21 to page 13, line 6 of the description:

> The genes encoding Fy^a and Fy^b antigens have been cloned. Transgenic mice have been constructed, whose RBCs [red blood cells] express the human Fy(a-b+) phenotype, by injecting genomic DNA into mouse zygotes. This knowledge can be used to generate transgenic mice expressing the human Fy(a+b-) phenotype. The offspring of these

> transgenic mice are expected to carry either human Fy^a or Fy^b antigens on their RBCs. Blood cells isolated from one group of transgenic mice are used to immunize the other group. This approach overcomes the observed problem that certain antigens can only induce an immune response by their close relatives, but not by lower species. Furthermore, it significantly limits the contamination of antibodies obtained by injection of human RBCs into mice. Perhaps most significantly, the only difference between the RBCs of the transgenic mouse being immunized and the transgenic mice RBCs being used as the immunogen is the Duffy antigen. Thus, it is highly probable that the mouse will mount an immune response to the Fy^a or Fy^b polymorphism. After immunization, the spleen of the immunized mice is isolated, fused to myeloma cells and processed by conventional hybridoma technique to select hybrids secreting anti-Fy^a and anti-Fy^b. Such MAbs will be useful in the replacement of human anti-serum reagents in the practice of blood typing and in the investigation of the topology and function of the Duffy glycoprotein.

[30] Based on this passage, the person skilled in the art would understand that the line of reasoning for the alleged invention is that given the tolerance of Fy^b transgenic mice for Fy^b and the tolerance of Fy^a transgenic mice for Fy^a and given that the epitope peculiar to the other Duffy protein polymorph is the only immunogenic targets available, it is soundly predictable that, following immunization of said transgenic mice with transgenic red blood cells expressing the other Duffy protein polymorph, the immune systems of said mice would produce antibodies against either Fy^a or Fy^b antigens.

[31] Moreover, the person skilled in the art would understand that the use of transgenic red blood cells would provide a native conformation of the Fy^a and Fy^b epitopes and should prevent the potential pitfalls of using enriched Duffy proteins or peptides as immunogens. The description indicates that the Fy^a and Fy^b epitopes are correctly presented only if the Duffy protein is within the milieu of the cell membrane (see page 10, lines 14-16 and lines 24-25). Thus, the line of reasoning directly addresses the previous reported failures.

[32] Given that the human immune system is naturally capable of differentiating between the Fy^a and Fy^b Duffy protein polymorphs based on the same immunological fundamentals that are in play in the recited method, the person skilled in the art would expect, absent indications to the contrary, that an antibody produced by another mammalian immune system would do the same if the host expresses a different human Duffy protein polymorph than the one expressed by the immunizing donor cells.

[33] Given the facts listed in paragraph [25] and the line of reasoning presented in paragraphs [27]-[29], and that no scientific rationale has been identified that would weigh against the line of reasoning, the Board finds that the specification provides a proper disclosure such that the person skilled in the art, given that disclosure, could have soundly predicted that the methods of claims 1 to 4 would have produced an antibody specific for the human Duffy protein polymorph Fy^a or Fy^b.

[34] However, claims 7 to 9 and 11 encompass methods wherein the transgenic mouse is immunized with a Duffy protein polymorph that does not necessarily have to be expressed on the surface of a cell. Yet, the description indicates that maintaining a native conformation of Duffy protein on a cell membrane is likely required in order to correctly form Fy^a and Fy^b epitopes and could explain, in part, the failure of previous attempts.

[35] Dependent claim 10, which recites Awherein the human Duffy protein polymorph of either

Fy^a or Fy^b which is not expressed by said transgenic mouse is expressed on a cell membrane@, encompasses a method wherein the transgenic mouse is immunized with a Duffy protein polymorph expressed on the surface of a cell of any origin, not necessarily a murine cell. However, it is clear from the description that minimizing the immunogenic targets is critical to the predicted utility of the recited method. It follows that the specification does not provide a factual basis and a sound line of reasoning for the use of any immunizing donor cell membrane other than a murine cell membrane.

[36] Accordingly, the above line of reasoning remains sound only insofar as the claimed method is limited to the use of murine cells expressing the human Duffy protein polymorph for the immunization. Therefore, the Board finds that the person skilled in the art, given the instant disclosure, could not have soundly predicted that the methods of claims 7 to 11 would produce an antibody specific for the human Duffy protein polymorph Fy^a or Fy^b since these claims allow for the Fy antigen to be presented in a non-native conformation (claims 7 to 9 and 11) or on a non-murine cell membrane (claim 10).

Sufficiency of disclosure of antibody and hybridoma claims

[37] The Examiner principally asserts that exemplary support is required for claims to hybridoma cell lines and monoclonal antibodies as novel products and the Examiner relies on the authority of *Pasteur*.

[38] The Applicant submitted that the *Pasteur* decision does not stand for a general proposition that products must be specifically exemplified in the application, but rather, that the specification need only provide clear directions to those of skill in the art such that the teaching of the specification would enable them to make and use the invention without undue experimentation. Further, the Applicant submitted that at the filing date of the present application, namely, November 14, 1997, methodology for the preparation of antibodies and hybridomas was well-known and a person skilled in the art would have at that time been able to predict that the methods described in the present application would produce the claimed antibodies and hybridomas.

[39] The disclosure of specific working examples for every embodiment of an invention that may fall within the scope of the claims is not necessarily required to fulfill the requirements of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*. However, the claimed subject matter must be sufficiently disclosed. This means that the specification must adequately describe and enable the claimed subject matter.

i) Written description: What is your invention?

[40] With respect to the written description requirement, the Commissioner has decided that in cases where a novel target polypeptide has been fully characterized, an applicant may validly claim monoclonal antibodies specific for the polypeptide even though the specification may not provide exemplary support, provided that the specification also satisfies the other requirements of the Act (e.g. the enablement requirement).

[41] The specification provides an adequate written description of the target Duffy protein Fy^a and Fy^b polymorphs. The structures of these particular polymorphs are known in the art and

fully characterized. Therefore, the Applicant has correctly and fully described the genus of the corresponding antibodies specific for the Fy^a and Fy^b polymorphs.

ii) Enablement requirement: How does it work?

[42] While the sound prediction principle demands that the person skilled in the art could predict that the claimed invention will work if practised, the second requirement emphasized in paragraph 27(3)(*b*) of the *Patent Act* is aimed at ensuring that sufficient information is provided to enable the claimed invention so the person skilled in the art could practise the invention without having to display inventive ingenuity or undertake undue experimentation.

[43] Although we found that the person skilled in the art could have soundly predicted that the methods of claims 1 to 4 would have produced an antibody specific for the human Duffy protein polymorph Fy^a or Fy^b, it remains to be determined whether the alleged invention requires undue experimentation or undue adaptation of the known core steps of preparing antibodies and hybridomas.

[44] Following *Pasteur* and the Final Action on the instant application, the Commissioner has considered several cases with issues relating to support for antibodies, including *Re Application of Central Sydney Area Health Service* (2008), Commissioner=s Decision No.1283, *Re Application of Immunex* (2010), Commissioner=s Decision No. 1302; and *Re application of Genentech Inc.* (2010), Commissioner=s Decision No.1307. In all instances no working examples of the claimed antibodies or hybridomas were provided by the description yet the Commissioner decided that there was sufficient support for claims to such products.

[45] Regarding the enablement requirement of paragraph 27(3)(*b*), it has been determined in those cases as a matter of fact that as early as 1988, a date prior to the laid open date of the instant application, the core steps for producing a murine monoclonal antibody were well-known and reliable and thus, considerable and protracted experimentation would generally not be required from the skilled person in order to make a monoclonal antibody capable of binding a given antigen. For any given situation, useful considerations include:

(i) whether there is a description of the polypeptide and knowledge of its real or expected immunogenicity;
(ii) whether the scope of an antibody claim in respect of the polypeptide is appropriate;
(iii) the availability and/or ease of production of the polypeptide;
(iv) whether a monoclonal antibody was actually prepared;
(v) whether there are indications of success or failure on record;
(vi) whether there are indications on record which suggest a requirement for undue experimentation or undue adaptation of the known core steps of preparing a monoclonal antibody; and
(vii) whether there are indications on record which suggest irreproducibility of an actual or proposed method of preparing a monoclonal antibody.

[46] Having in mind these considerations, the following becomes apparent: It is clear from the description on page 2, lines 9 to 18, page 10, lines 16 to 25 and page 18 lines 2 to 5 that previous attempts to produce the claimed antibodies and hybridomas using the known techniques had failed. It directly follows that the expected immunogenicity of the target epitope on each polymorph using the ordinary methods for producing antibodies and hybridomas is low.

[47] The specification discloses how to modify the generally used method of preparing hybridomas and antibodies to avoid the previously reported failures and obtain antibodies specific to the Duffy protein Fy^a and Fy^b polymorphs. Those modifications essentially relate to the nature of the host that is immunized and the way the antigen is presented to the host. The modified method comprises the use of transgenic animals expressing the Duffy protein Fy^a or Fy^b polymorph for cross-immunization purposes using transgenic red blood cells expressing the relevant polymorph. Both the Duffy protein Fy^a and Fy^b polymorphs are known in the art and the person skilled in the art would expect, absent indications to the contrary, to obtain or produce the required nucleic acids encoding the target polypeptides in a routine manner.

[48] A working example of the production of transgenic animals expressing the Duffy protein Fy^b antigen is disclosed in the description. The description discloses that the production of transgenic animals expressing the Duffy protein Fy^a antigen is directly adaptable from the method described to produce transgenic animals expressing the Duffy protein Fy^b antigen and further teaches how to do so. There is no indication in the specification or in the state of the art that suggests technical difficulties associated with the proposed method that would amount to undue experimentation or undue adaptation.

[49] In view of the above and of the previous findings regarding the soundness of the prediction that the recited method would produce the desired hybridomas and antibodies, we conclude that inventive or undue experimentation would not be required by the person skilled in the art to practice the recited method to obtain the claimed antibody and hybridoma as contemplated by the inventor.

CONCLUSIONS

[50] We conclude that claims 1 to 6 do not go beyond the limits of a sound prediction and do not exceed what has been disclosed and enabled. Claims 1 to 6 are therefore compliant with section 2 of the *Patent Act* and section 84 of the *Patent Rules* and the specification is compliant with subsection 27(3) of the *Patent Act*.

[51] We also conclude that the person skilled in the art, given the instant disclosure, would not have soundly predicted that the methods of claims 7 to 11 would produce an antibody specific for the human Fy^a or Fy^b Duffy protein polymorph. Claims 7 to 11 are therefore not compliant with the *Patent Act*. However, they can be rendered compliant by incorporating the subject matter of claim 10 into claim 7 and by specifying that the cell membrane is a murine cell membrane.

RECOMMENDATIONS

[52] We recommend that the Applicant be informed, in accordance with paragraph 31(*c*) of the *Patent Rules*, that one of the following amendments, and only one of the following amendments, are necessary for compliance with the *Patent Act* and *Patent Rules*:

a) deletion of claims 7 to 11, or

b) amendment of claim 7 to incorporate claim 10 and to specify that the cell membrane is a murine cell membrane, and adjustment of claim numbering and dependencies accordingly.

Marcel Brisebois — Member

Ed MacLaurin — Member

Serge Meunier — Member

COMMISSIONER=S DECISION

[53] I concur with the findings and recommendation of the Patent Appeal Board. Accordingly, I invite the Applicant to make one of the above amendments, and only one of the above amendments, within three months from the date of this decision, failing which I intend to refuse the application.

Sylvain Laporte

Commissioner of Patents

Dated at Gatineau, Quebec
this 8 day of March, 2012