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Datasheet for the decision of 6 May 2019

Case Number: T 1744/16 - 3.3.04

Application Number: 10726700.7

Publication Number: 2421551

IPC: A61K38/17, A61L27/52, A61L27/22, A61K9/06, A61K47/42

Language of the proceedings: EN

Title of invention:
Silk Fibroin Hydrogels and uses thereof

Patent Proprietor:
Allergan, Inc.

Opponent:
Tufts University

Headword:
Silk Fibroin Hydrogels/ALLERGAN

Relevant legal provisions:
EPC Art. 54, 56, 83, 113(1)

Keyword:
Substantial procedural violation - (no)
Novelty - (yes)
Inventive step - (yes)
Sufficiency of disclosure - (yes)

Decisions cited:

Catchword:

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Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1744/16 - 3.3.04

D E C I S I O N
of Technical Board of Appeal 3.3.04
of 6 May 2019

Appellant: (Opponent)	Tufts University Ballou Hall Medford MA 02155 (US)
Representative:	Brown, David Leslie Haseltine Lake LLP Redcliff Quay 120 Redcliff Street Bristol BS1 6HU (GB)
Respondent: (Patent Proprietor)	Allergan, Inc. 2525 Dupont Drive Irvine, CA 92612 (US)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 11 May 2016 concerning maintenance of the European Patent No. 2421551 in amended form.**

Composition of the Board:

Chair	G. Alt
Members:	P. de Heij
	A. Chakravarty

Summary of Facts and Submissions

I. European patent EP 2 421 551, entitled "*Silk Fibroin Hydrogels and uses thereof*" derives from European patent application No. 10 726 700.7.

II. In an interlocutory decision, the opposition division decided that, account being taken of the amendments in the form of the main request (including the set of claims submitted on 5 January 2015), the patent and the invention to which it related met the requirements of the EPC (Article 101(3)(a) EPC).

III. An appeal was filed by the opponent (appellant) against this interlocutory decision. The patent proprietor is respondent to this appeal.

IV. In the decision under appeal, the opposition division dealt with objections raised by the opponent under Article 123(2) EPC, Article 83 EPC, Article 54 EPC and Article 56 EPC.

V. Regarding the question of whether or not document D15 was comprised in the state of the art, the opposition division held that "*...D15a provides the necessary evidence for the alleged publication date in 2007 of D15: D15a is merely a collection of Transactions of the 32nd Annual Meeting in Illinois in April 2007, said collection being published in 2012 in book form. This does however not cast doubt as to when the Poster 719 (i.e. D15) was made available to the public. There seems to be no valid reason to assume that the poster 719 (D15) was not made available at the meeting in April 2007. The opposition division must therefore conclude that D15 is prior art according to Article 54 (2) EPC*" (see point 8.16 of the decision under appeal).

VI. With the statement of grounds of appeal, the appellant submitted documents D49 and D50.

VII. The respondent replied to the statement of grounds of appeal and re-filed sets of claims of the main, first, second and third auxiliary requests, originally submitted on 5 January 2015 and of the fourth, fifth and sixth auxiliary requests, first submitted on 26 February 2016.

VIII. Claims 1, 23 and 24 of the main request (considered allowable by the opposition division) read as follows:

"1. A silk fibroin hydrogel formulation wherein the formulation comprises:

a) a gel phase, the gel phase including hydrogel particles comprising a substantially sericin-depleted silk fibroin and an amphiphilic peptide; and

b) a carrier phase,

for use in a method of soft tissue reconstruction or augmentation, the method comprising the step of administering the formulation to a soft tissue region of an individual in need of soft tissue reconstruction or augmentation.

23. A silk fibroin hydrogel formulation for use in a method of soft tissue reconstruction, wherein the formulation comprises

i) a gel phase, the gel phase including hydrogel particles comprising a substantially sericin-depleted silk fibroin and an amphiphilic peptide;and

ii) a carrier phase, wherein the carrier phase comprises saline, the method comprising the steps of

a) placing an implantable medical device into an individual at the desired location;

b) expanding the device by putting a silk fibroin hydrogel formulation into the device.

24. A silk fibroin hydrogel formulation for use in a method of breast reconstruction or augmentation, wherein the formulation comprises

a) a gel phase, the gel phase including hydrogel particles comprising a substantially sericin-depleted silk fibroin and an amphiphilic peptide; and

b) a carrier phase, wherein the carrier phase comprises saline,

the method comprising the step of subdermal administration of a silk fibroin hydrogel formulation to a breast of an individual in need of breast reconstruction or augmentation".

IX. The board appointed oral proceedings and subsequently issued a communication pursuant to Article 15(1) RPBA 2007, setting out its preliminary and non-binding appreciation of the substantive and legal matters concerning the appeal, *inter alia* that "*the status of document D15 will [...] be a topic at the oral proceedings*".

X. With the reply to this communication, the respondent submitted document D15b.

XI. The following documents are mentioned in this decision.

D2: Gil E.S. *et al.*, "Effect of [beta]-sheet crystals on the thermal and rheological behavior of protein-based hydrogels derived from gelatin and silk fibroin", Macromol. Biosci., 2005, 5(8), 702-709.

D3: Gil E.S. *et al.*, "Swelling behavior and morphological evolution of mixed gelatin/silk fibroin hydrogels", Biomacromolecules, 2005, 6(6), 3079-3087.

D8: WO 2005/012606

D15: Collette A.L. *et al.*, "Comparative In vivo Evaluation of a novel Silk hydrogel Injectable for Drug Delivery", page 719, corresponding to Abstract No. 719 of the 32nd annual meeting of the Society for Biomaterials 2007, mentioned in document D15a

D15a: Transactions of the 32nd Annual meeting of the society for Biomaterials, published 2012.

D15b: "Serica Researchers Present New Data Supporting Use Of Novel Silk Gel In Tissue Repair, Drug Delivery, Reconstructive And Aesthetic Surgery", published online on 24 April 2007 on Bioprocess Online, accessed https://www.bioprocessonline.com/doc/serica-researchers-present-new-data supportin-0001 on 25 April 2019.

D17: Wang Y. *et al.*, "Stem cell-based tissue engineering with silk biomaterials", Biomaterials, 2006, 27(36),6064-6082.

D18: Vepari C. and Kaplan D. "Silk as a biomaterial", Progress in Polymer Science, 32(8-9), 2007, 991-1007.

D44: Declaration of Dr Daunch dated 12 February 2016

D49: Declaration of Dr Kaplan dated 21 September 2016

D50: Schaffner P. and Dard M.M., "Structure and function of RGD peptides involved in bone biology", Cellular and Molecular Life Sciences CMLS, 2003, 60, 119-132.

XII. The arguments of the appellant relevant to the decision can be summarised as follows.

The appeal was directed only against the decision of the opposition division to maintain the patent in amended form, on the grounds of Article 100(a) EPC (Article 54 EPC and Article 56 EPC) and Article 100(b) EPC (cf. Article 83 EPC). No appeal was made on the grounds of Rule 80 EPC, Article 123(2) EPC, Article 123(3) EPC, Article 84 EPC or Rule 116(1) EPC.

Substantial procedural violation - Article 113(1) EPC

The decision under appeal was not sufficiently reasoned because it did not take all of the appellant's submissions into account. Instead, the opposition division substituted its own unproven suppositions in place of the evidence on file. This constituted a violation of the appellant's right to be heard pursuant to Article 113(1) EPC.

The requirement of sufficient reasoning had been violated in three ways. The first was the absence from the decision of evidence for the definition of "peptide" to mean "*up to 100 amino acids*". The second was the absence in the decision of a logical position on the narrow meaning of the term "amphiphilic",

proposed by the respondent. This affected the opposition division's decision on sufficiency of disclosure. The third was the lack of a decision on whether the silk fibroin of documents D2, D3 and D15 was "substantially sericin-depleted" and whether the "*films*" taught in documents D2 and D3 comprised a hydrogel.

Main request

Disclosure of the invention - Article 100(b) EPC/ Article 83 EPC

The invention was not disclosed in such a way as to enable the skilled person to carry it out. The claim referred to an "amphiphilic peptide". The skilled person could not determine which molecules were meant by said term without an undue burden with respect to the term "peptide", in view of the fact that the term included any peptide chain being shorter than the full protein. The declaration of Dr Daunch (D44) exacerbated this problem because it stated that amphiphilic structures had to have "*molecular sizes that do not overwhelm the effect of the hydrophilic and hydrophobic residues*". However, the patent was silent both on the critical amino acid number and how to determine this non-overwhelming effect. There was no evidence that there was common general knowledge of these features in the published literature before the priority date or the filing date of the application.

The board notes that the appellant also objected that the invention was insufficiently disclosed with respect to the feature "substantially sericin-depleted". However, this argument was not relevant to the decision as the objection was conditional and the condition was

not met. The objection is therefore not summarised here.

Status of document D15 as comprised in the state of the art according to Article 54(2) EPC

The publication date of document D15 was supported by evidence in document D15a. Furthermore, document D15b, a news article from 24 April 2007, referred to the research presented at the Society for Biomaterials annual meeting in Chicago the week before (i.e. 18 to 21 April 2007; see the first paragraph). The third paragraph of document D15b referred directly to the poster presentation of document D15, namely "*Comparative In Vivo Evaluation of a Novel Silk Hydrogel Injectable for Drug Delivery*". This clearly demonstrated that document D15 was presented at the Society for Biomaterials annual meeting in Chicago in on 18 to 21 April 2007.

Documents D15a and D15b proved that a poster having the same title and content as document D15 had been presented at the above mentioned meeting in 2007. On the balance of probabilities, and in view of the usual practice of conference proceedings, it had to be assumed that the information in document D15 was the same as the information that was presented on the poster at the meeting.

The issue of whether or not the poster presented at the 2007 meeting and the abstract published in 2012 contained the same information, had not been raised in the appeal proceedings except at the oral proceedings before the board. The appellant had not been in a position to prepare and therefore this issue should not be a part of the proceedings in view of Article 13 RPBA.

Novelty - Article 54 EPC

Claims 1, 23 and 24 lacked novelty over the disclosure in document D15.

In addition, each of documents D2 and D3 disclosed subject-matter which anticipated claims 1, 23 and 24 as maintained by the decision under appeal.

The opposition division accepted that documents D2 and D3 disclosed compositions which were hydrogels and which were made by using substantially sericin-depleted silk fibroin. Gelatin was a compound falling within the meaning of the feature "amphiphilic peptide". Indeed, all molecules of which gelatin was composed were peptides which retained the characteristic hydrophilic and hydrophobic groupings of collagen.

The features "hydrogel particles" and "carrier phase" should be broadly interpreted.

Claim 1 lacked any indication of the particle size. Thus, the "*fracturing*" of the swollen gelatin/silk fibroin (G/SF) hydrogels disclosed in document D3 in Figures 10 and 11 generated multiple particles falling within the definition in the claim.

Furthermore, the presence of particles within a carrier phase was disclosed in document D2 (page 704, column 1, lines 9 to 13,) and in document D3 (page 3080, column 1, section 2). Document D2 disclosed a series of G/SF solutions transformed into gels. Document D3 disclosed 1 cm x 1 cm squares cut from each hydrogel film, hydrated in buffer solution.

Documents D17 and D18 explicitly referred to documents D2 and D3 and cited them as references. The content of these documents therefore had to be regarded as incorporated in documents D17 and D18. Thus, documents D17 and D18 were independently anticipatory.

Inventive step - Article 56 EPC

Even if document D15 was considered not to be novelty destroying, the subject-matter of claim 1 lacked an inventive step, with document D15 representing the closest prior art.

Moreover, the decision under appeal evaluated inventive step only starting from documents D15 or D21 as closest prior art. However, documents D2, D3, D17 and D18 mentioned in the notice of opposition, had been not been withdrawn in the first-instance procedure and all were maintained in the appeal as candidate closest prior art publications.

Document D8 was as close as document D15. The argument presented starting from document D15 applied analogously, using (a) one or more of documents D15, D50 and D26 as secondary prior art, teaching that an RGD peptide was an amphiphilic peptide, and (b) one of documents D21 and D34 as secondary prior art, teaching the provision of hydrogel in the form of particles.

XIII. The arguments of the respondent relevant to the decision can be summarised as follows.

Substantial procedural violation - Article 113(1) EPC

The appellant had raised three points where they considered that the opposition division had made a substantial procedural violation. The first was the lack of evidence in the decision for the term "*peptide*" to mean amino acid chains of "*up to 100 amino acids*". The second was the absence of a logical position on the construction of the term "amphiphilic". Finally the appellant considered that there had been no discussion of the argumentation and evidence relating to "*substantially sericin-depleted*" and "*films*".

However, there had been no substantial procedural violation in any of these three points.

In relation to the appellant's right to be heard, all disputed terms/features had either been discussed at great length during the written procedure or were addressed and discussed during the oral proceedings before the opposition division. The mere fact that the opposition division's position was different from the one of the proprietor did not amount to a substantial violation. The decision under appeal did not rely on grounds or evidence on which the parties had had no possibility to comment. Moreover, the interpretation of the term "peptide" had not been decisive for the decision of the opposition division.

In relation to the argument that the decision was not reasoned or illogical, this was also incorrect. The opposition division mentioned the numerical cut-off in the definition of the term "peptide" merely to clarify

that there was a distinction between the terms "*peptide*" and "*protein*". In relation to the term "amphiphilic", the opposition division explicitly referred to paragraphs [0013], [0079], [0083] and [0084] of the patent, which as such could therefore not come as a surprise.

A discussion of the argumentation and evidence relating to "substantially sericin-depleted" and "*films*" had not been necessary for the the opposition division to come to their decision.

Main request

Disclosure of the invention - Article 100(b) EPC/ Article 83 EPC

The argument that the term "amphiphilic peptide" was not sufficiently disclosed in the patent was an objection introduced only during oral proceedings before the opposition division, allegedly in reaction to declaration D44. Thus, the argument was late filed during the opposition proceedings and should be excluded from the appeal proceedings in view of Article 12(4) RPBA.

On the issue of whether or not the expression "amphiphilic peptide" was the cause of the claimed invention not meeting the requirements of Article 83 EPC, a person of skill in the art understood that a peptide was a much smaller molecule than a protein and would also easily be able to provide such a molecule. Indeed, this latter point was not contested by the appellant (see point 5.5.10 of the statement of grounds of appeal).

The term "amphiphilic" would also not have presented an undue hurdle in working the invention because the person of skill in the art knew that an amphiphilic peptide should have both hydrophobic and hydrophilic properties and could carry out the invention by choosing the amino acids accordingly. Should the resultant molecule be very large, it could have a three-dimensional configuration in which the effect of the hydrophobic and hydrophilic residues was overwhelmed, leading to a non-amphiphilic molecule. However, the person of skill in the art would recognize that this was the case and knew that such a molecule did not fall within the expression "amphiphilic peptide". Furthermore, the objection made by the appellant was, at least in part, an objection of lack of clarity. However, lack of clarity was not a ground for opposition.

Status of document D15 as comprised in the state of the art according to Article 54(2) EPC

Document D15 was not pre-published. The opposition division's statement that there was no valid reason to assume that this document had not been made available at the meeting in April 2007 was not suitable to prove the availability to the public of the document. No proof of this public availability had in fact been provided. Document D15 did not contain any publication date. Document D15a merely disclosed 2007 and 2012 as copyright dates. Neither of these were proof of the publication date of document D15 and its content.

Novelty - Article 54 EPC

Since document D15 was not prior art for the claimed invention, it could not anticipate it.

Documents D2 and D3 did not disclose any of the following features of the claimed invention: (1) a substantially sericin-depleted silk fibroin, (2) an amphiphilic peptide (3) hydrogel particles, (4) a carrier plus gel and (5) the specifically recited surgical use.

In relation to the particle and gel/carrier phase features, neither document D2 or D3 disclosed the treatment of a product such that multiple particles were generated. The "*fractured*" gel disclosed in Figures 10 and 11 of document D3 was not the same as hydrogel particles embedded in a carrier phrase. Moreover, document D3 did not disclose the provision of a formulation for use in a method of a soft tissue reconstruction.

The comments on documents D2 and D3 applied also to documents D17 and D18.

Inventive step - Article 56 EPC

As noted above, document D15 was not comprised in the state of the art for the claimed invention and was therefore not relevant in the assessment of inventive step. No other reasoned argument on inventive step of the claimed invention had been provided in writing.

Article 13(1) RPBA gave the board discretion not to admit new lines argument. In general late filed arguments should not be admitted. In the present case, the lines of argument starting from document D3 or D8 representing the closest prior art should not be admitted into the proceedings because they were new and

as such no preparation had been to make a proper response to them.

XIV. Oral proceedings before the board were held on 6 May 2019. At the end of these proceedings the chair announced the decision of the board.

XV. The appellant requested:

- that the decision under appeal be set aside and that the patent be revoked;

- alternatively, as an auxiliary request, that the decision under appeal be set aside due to a substantial procedural violation, that the case be remitted to the first instance for further prosecution and that the appeal fee be reimbursed accordingly.

XVI. The respondent requested:

- that the appeal be dismissed and the patent thus be maintained on the basis of the set of claims of the main request as submitted on 5 January 2015 (the set of claims considered allowable by the opposition division);

- alternatively, that the patent be maintained on the basis of the set of claims of the first, second or third auxiliary request, submitted with the letter dated 5 January 2015, or on the basis of the set of claims of the fourth, fifth or sixth auxiliary request, submitted with the letter dated 26 February 2016;

- that documents D15b, D49 and D50 not be admitted into the proceedings;

- that the objection regarding insufficient disclosure relating to the feature 'amphiphilic peptide' not be admitted into the proceedings;

- that the objection regarding insufficient disclosure relating to the feature 'substantially sericin-depleted' not be admitted into the proceedings.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 99 EPC and is therefore admissible.

Substantial procedural violation - Article 113(1) EPC

2. The board notes that the opposition division did not rely on any particular definition of the word "peptide" to reach its decision but instead stated: "*The opposition division is of the opinion that indeed no exact number of amino acids can be said to define the distinction between a protein and a peptide*" (see decision under appeal, point 7.4). Thus, the appellant is not correct that the opposition division relied on a definition of the term "peptide" on which they had not been able to comment.

3. As far as the meaning of "amphiphilic" within the feature "amphiphilic peptide" is concerned, the board notes that the opposition division decided, in the context of the assessment of sufficiency of disclosure, that the description explains what is considered to be an amphiphilic peptide, giving examples of hydrophilic and hydrophobic domains, and that the declaration document D44 of Dr Daunch did not contradict that explanation (see decision under appeal, point 7.4). It therefore cannot be concluded that the opposition

division failed to decide on the alleged narrow interpretation of "amphiphilic" by the respondent, as this interpretation is clearly not endorsed.

4. In deciding that documents D2, D3 and D15 did not anticipate the subject-matter of the independent claims, the opposition division held that none of these documents disclosed the feature "hydrogel particles" (see decision under appeal, points 8.8 and 8.20). Thus, it was not necessary for the opposition division to decide whether the silk fibroin of these documents was "substantially sericin depleted".

5. Turning to the argument relating to the lack of a proper discussion in the decision of the feature "*films*" disclosed in documents D2 and D3, the board considers that the decision under appeal does in fact deal substantively with this issue in point 8.8, final paragraph: "*D2 and D3 fail to disclose a* [sic] *'hydrogel particles', because these documents disclose a hydrogel film, which cannot be admitted to fall within the expression 'hydrogel particles'*". The fact that the opposition division's conclusion is different from the appellant's position on this issue cannot be considered a substantial procedural violation.

6. In view of the foregoing, the board cannot identify any procedural violation by the opposition division.

Admission of documents D49 and D50 - Article 12(4) RPBA 2007

7. Although the board admitted documents D49 and D50 into the proceedings, they played no role in reaching the decision and hence the reasons for their admission are moot.

Admission of document D15b - Article 13(1) RPBA 2007

8. Document D15b was filed with the appellant's reply to the board's communication pursuant to Article 15(1) RPBA 2007. This document is admitted into the proceedings. However, because of the conclusion set out in point 17 below, the reasons for its admission are moot.

Status of document D15 as comprised in the state of the art according to Article 54(2) EPC

9. Document D15 was cited as prior art by the appellant in relation to both novelty and inventive step of the claimed subject-matter. The respondent argued that it had not been demonstrated that it or its contents had been available to the public at the the relevant date of the patent.

10. Document D15, as supplied by the appellant, is a single-sided document with an abstract carrying the title "*Comparative In Vivo Evaluation of a Novel Silk Hydrogel Injectable for Drug Delivery*". The only bibliographic information given on the document itself are the authors' names, their institutional affiliations and "*Abstract number - 719*" is printed in the footer of the document. No publication date is given.

11. In the absence of a publication date, the board must conclude that document D15 on its own is not sufficient proof that it or its contents were available to the public at the relevant date of the patent. It remains to be assessed whether it can be proven by other means that document D15 or its contents had been made available to the public.

12. Document D15a, filed by the appellant during the opposition proceedings, has a cover page with the titles "*32nd Annual Meeting of the Society for Biomaterials 2007*", and "*Transactions of the 32nd Annual Meeting Volume XXX*". This cover page also mentions the date of the meeting, 18 to 21 April 2007. There are two copyright dates on the document, one being 2007 and the other being 2012. It is common ground that 2007 was the date of the meeting, while 2012 represents the date on which the transactions, including document D15a, were published. Document D15a contains a reference to an abstract having the same number and title as document D15, as well as a page having the contents of document D15, i.e. the abstract with its title, with the number 719 in the footer.

13. Document D15b, is a news article from 24 April 2007 referring to the research presented at the Society for Biomaterials annual meeting in Chicago in the previous week.

14. The appellant argued that documents D15a and D15b proved that a poster having the same title and content as disclosed in document D15 had been presented at the above mentioned meeting in 2007, because it was the usual practice of conference proceedings that the information and abstract disclosed therein was the same as the information that was presented on the poster at the meeting.

15. The board considers that document D15a establishes that a document, essentially identical to document D15, was published in 2012. Furthermore, document D15b serves as evidence that a poster having the same title as document D15 or the abstract in document D15a was

presented at the 32nd annual meeting of the Society for Biomaterials in 2007. However, document D15b does not provide evidence that the contents of the poster presented at the meeting, i.e. information beyond the title, were identical to the contents of document D15 or the abstract in document D15a.

16. In point 8.16 of the decision under appeal, the opposition division took the view that "*there seems to be no valid reason to assume that the poster 719 was not made available at the meeting in 2007*". However, while, as stated in point 14 above, it can be accepted that a poster with the title was indeed presented at the meeting, in the board's view, it has not been established that the contents of the poster presented at the meeting were identical to those disclosed in document D15 or to the abstract published in the conference proceedings document D15a.

17. In view of this, the board cannot conclude that document D15 or the contents of document D15 or the abstract in document D15a were available to the public before the date of filing of the patent.

Admission of new lines of argument - Article 13 RPBA 2007

18. The appellant objected that the issue of whether or not the poster and document D15 or the abstract in document D15a contained identical information had not been raised earlier in the appeal proceedings and that this line of argument should therefore be excluded from the proceedings.

19. In this regard, the board considers that the issues of whether or not document D15 *per se* had been made available to the public before the relevant date of the

patent and of whether or not the poster presented at the meeting held in 2007 and the abstract published in 2012 contained the same information are parts of the same assessment of the validity of the appellant's chain of reasoning, a reasoning which seeks to prove that document D15 - including its contents - are comprised in the state of the art for the patent.

20. Thus, the board does not consider that casting doubt on whether the poster and the abstract contained identical information is a new line of argument that constitutes an unallowable amendment of the respondent's case.

21. In view of the above considerations, document D15 and its contents are considered as not being comprised in the state of the art in the sense of Article 54(2) EPC and are therefore of no further relevance in the appeal proceedings.

Main request

Novelty - Article 54 EPC

22. Claim 1 is for a silk fibroin hydrogel formulation and is drafted in the purpose-limited product format pursuant to Article 54(5) EPC. The claimed hydrogel formulation comprises a gel phase and a carrier phase, wherein the gel phase includes hydrogel particles.

23. The appellant argued that documents D2 and D3 disclosed a silk fibroin hydrogel formulation anticipating the the claimed subject-matter. The opposition division held that neither document D2 nor document D3 directly and unambiguously disclosed a gel phase including hydrogel particles.

24. As regards document D3, the appellant's main line of argument in regard of the "gel phase, including hydrogel particles" feature was that document D3 disclosed 1 cm x 1 cm squares cut from a hydrogel film which are subsequently hydrated in buffer solution. These hydrogel squares in buffer should be regarded as particles within the meaning of the claim.

25. Document D3 indeed discloses the production of 1 cm x 1 cm squares of silk fibroin/gelatin film (see page 3080, left-hand column, "*Analysis*") and also discloses that these squares are immersed in a phosphate-buffered saline solution resulting in the production of a hydrogel.

26. However, the board is of the view that the skilled reader would not consider these 1 cm x 1 cm squares of hydrogel film to correspond to the feature "a gel phase, including hydrogel particles", even when adopting a very broad interpretation of the term "particles". The board therefore agrees with the opposition division that "*the term "particles" impl[ies] that the bodies are tiny*" (see decision under appeal, point 8.8). This view is further supported by the fact that, according to the description, one of the purposes of the hydrogel formulation is its suitability for injection, see paragraph [0014]. A 1 cm x 1 cm square would certainly not be suitable for injection. The board also agrees with the opposition division that document D3 does not disclose a gel phase including hydrogel particles (plural), because document D3 discloses only single squares of film placed separately in buffer solution: "*Analysis. A 1 cm x 1 cm specimen was cut from each film and weighed prior to immersion in a phosphate buffered saline solution*" (see document D3, page 3080, left-hand column, "*Analysis*").

27. The appellant further argued that document D3 disclosed the feature "gel phase, including hydrogel particles" because the hydrogels disclosed therein were "*fractured*", resulting in particle formation. The board notes that Figures 10 and 11 mention "*fractured*" hydrogels. In the context of document D3 however this term in fact relates to the porosity of these gels.

28. In relation to document D2, the appellant considered that the disclosure of a series of gelatin/silk fibroin (G/SF) solutions transformed into gels (see page 704, column 1, lines 9 to 13) was a disclosure of a fluid carrier phase carrying hydrogel particles. The respective passage reads: "*In a series of G/SF solutions (10% w/v in water) not treated to induce the SF beta-sheet conformation, each specimen was mounted at 40°C and cooled to 5°C. Upon cooling, the solutions transformed into gels. After holding the specimens at 5°C for 5 min, the rheological analyses were performed.*" The board cannot, in the passage of document D2 referred to, identify any mention of a gel phase including hydrogel particles.

29. In summary, the disclosures in documents D2 and D3 cannot be considered as anticipating the subject-matter of claim 1, or claims 23 and 24 (for the same reason).

30. In view of the above considerations, documents D17 and D18, which allegedly incorporate the disclosure in documents D2 and D3, do not anticipate either.

Inventive step - Article 56 EPC

Admission of new lines of argument - Article 13 RPBA 2007

31. In the statement of grounds of appeal, the appellant provided substantiated arguments as to why the subject-matter of the main request lacked an inventive step starting from document D15 representing the closest prior art.

32. At the oral proceedings, the board decided that document D15 was not comprised in the state of the art for the patent in suit (see above).

33. The appellant subsequently argued that the claimed subject-matter did not involve an inventive step because the skilled person, starting from document D3 or from document D8 representing the closest prior art, would have considered it obvious.

34. The respondent considered that these lines of argument should not be admitted into the proceedings because they were new and as such no preparation could have been made to allow a proper response to them.

35. The board notes that point 5.7.8 of the statement of grounds of appeal contains the following passage: "*D2, D3, D15, D17, D18 and D21 are maintained in the present appeal as candidate closest prior art publications, without prejudice to the potential role of any prior art in these proceedings as additional prior art to render the claimed subject-matter obvious*". However, a line of argument on inventive step based on documents D2, D3, D17, D18 and D21 was not further substantiated in the written procedure.

36. In point 5.7.50 of the statement of grounds of appeal, the appellant submits that the arguments presented in relation to document D15 representing the closest prior art could be applied analogously when considering document D8 to represent the closest prior art. However, no particular disclosure in document D8 was identified as representing the closest prior art. This meant that the board and the respondent would on their own have to identify a relevant passage in that document and determine the difference between this and the claimed subject-matter.

37. The board therefore takes the view that a line of argument starting from any of documents D2, D3, D8, D17, D18 and D21 representing the closest prior art, if admitted, would have been made for the first time at the oral proceedings before the board. As such they would represent an amendment to the appellant's case, the admission of which is at the board's discretion.

38. Article 13(1) RPBA 2007 provides that "*Any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.*"

39. Admitting the proposed lines of argument on inventive step starting from either document D3 or D8 would have necessitated, at least, delaying the proceedings because neither the respondent nor the board were prepared for them - which would run counter the need for procedural economy. Furthermore, doubts about the public availability of document D15 had been endorsed in the board's communication. Thus, taking the state of

the proceedings into consideration, it is the board's view that the new lines of argument, made at the oral proceedings, were proposed at an inappropriate point in time, in effect at the latest possible point in time.

40. In view of these considerations, the board exercised its discretion not to admit these lines of argument based on document D2 and D8 as closest prior art into the appeal proceedings. No line of argument was put forward starting from documents D2, D17, D18 or D21 as closest prior art.

Disclosure of the invention - Article 100(b) EPC/Article 83 EPC

41. The appellant's objection to the term "amphiphilic peptide" is based on whether or not the skilled person could without an undue burden provide suitable amphiphilic peptides in view of the fact that the term "amphiphilic peptide" had to be interpreted broadly, i.e. it included long peptide chains which, even if they contained hydrophobic and hydrophilic regions, might fold in such a way that they were not amphiphilic overall.

42. The respondent requested to not admit this objection into the appeal proceedings, however, the board decided to admit the objection. The reasons for this decision are moot as the objection cannot be endorsed.

43. The requirements of Article 100(b)/ Article 83 EPC are complied with if the patent discloses the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

44. It is established case law that an "*objection of lack of sufficient disclosure presupposes that there are serious doubts, substantiated by verifiable facts*" and that "*[i]n order to establish insufficiency, the burden of proof is upon an opponent to establish on the balance of probabilities that a skilled reader of the patent, using his common general knowledge, would be unable to carry out the invention*" (Case Law of the Boards of Appeal of the European Patent Office, 8th edition, II.C.8; references omitted).

45. In the present case, the appellant relies on the unknown molecular size of the peptide referred to in claim 1 and the statement in declaration D44 that "*the term 'amphiphilic' is used throughout scientific literature for structures of molecular sizes that do not overwhelm the effect of the hydrophilic and hydrophobic residues*" (see declaration D44, section IV) to support the case that the skilled person faced an undue burden in identifying such "amphiphilic peptides".

46. The board accepts that the definition in declaration D44 is essentially correct and was known by the skilled person. However, it does not see this statement as establishing that the skilled person could not have made, or identified, amphiphilic peptides based on the disclosure of the patent in combination with common general knowledge.

47. In the case of those longer peptides where folding could be an issue, the board has seen no evidence that the skilled person could not make those long peptides and identify those that were amphiphilic, based on the disclosure of the patent in combination with common general knowledge. The fact that the patent does not

teach the skilled person the maximum size of the peptide does not alter the conclusion.

48. In view of the above considerations, the board is of the view that the disclosure of the claimed invention meets the requirements of Article 83 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

C. Rodríguez Rodríguez G. Alt

Decision electronically authenticated