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Datasheet for the decision of 5 August 2025

Case Number: T 0434/23 - 3.3.04

Application Number: 10713516.2

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Title of invention:
Adjuvanting meningococcal factor H binding protein

Patent Proprietor:
GlaxoSmithKline Biologicals SA

Opponent:
Sanofi Pasteur

Headword:
Meningococcal factor H binding protein/GLAXOSMITHKLINE

Relevant legal provisions:
EPC Art. 100(a), 56
RPBA 2020 Art. 12(3), 12(5)

Keyword:
Inventive step - (no)

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Case Number: T 0434/23 - 3.3.04

D E C I S I O N
of Technical Board of Appeal 3.3.04
of 5 August 2025

Appellant: (Patent Proprietor)	GlaxoSmithKline Biologicals SA Rue de l'Institut 89 1330 Rixensart (BE)
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Representative:	Zwicker, Jörk ZSP Patentanwälte PartG mbB Hansastraße 32 80686 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 12 January 2023 revoking European patent No. 2411048 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairwoman	M. Pregetter
Members:	O. Lechner
	L. Bühler

Summary of Facts and Submissions

I. The patent proprietor (appellant) filed an appeal against the opposition division's decision to revoke European patent No. 2 411 048.

II. The patent was granted on the basis of European patent application No. 10 713 516.2, which had been filed as an international application under the PCT and published as WO 2010/109323 (application as filed).

III. In its decision the opposition division decided that the subject-matter of claims 4 and 7 of the patent as granted (main request) extended beyond the content of the application as filed (Article 100(c) EPC).
The set of claims according to auxiliary request 1 (first filed as auxiliary request 6 by letter dated 9 September 2022) was, *inter alia*, found to be novel over the disclosure of documents D1 to D4 (Article 54 EPC), to be sufficiently disclosed (Article 83 EPC), but to lack an inventive step (Article 56 EPC) when starting from the disclosure of document D1 as the closest prior art.
The set of claims according to auxiliary request 2 (first filed as auxiliary request 7 by letter dated 9 September 2022) was found to be insufficiently disclosed (Article 83 EPC).

IV. By letter dated 9 February 2023, the appellant requested that point 46 of the minutes of the oral proceedings before the opposition division be corrected. The opposition division refused to make the correction proposed by the appellant, but instead reformulated point 46 of the minutes and issued a corrected version of the minutes.

V. With its statement of grounds of appeal, the appellant maintained the main request (claims as granted) and auxiliary requests 1 to 5 filed by letter dated 2 July 2021 and auxiliary requests 6 to 13 filed by letter dated 9 September 2022 during the opposition proceedings. It also submitted new auxiliary requests 14 to 22.
The appellant argued that the opposition division had committed a procedural violation as it had not provided any reasons in the decision under appeal on the formally maintained auxiliary requests 3 to 13 as renumbered during oral proceedings and corresponding to auxiliary requests 1 to 5 filed on 2 July 2021 and auxiliary requests 8 to 13 filed on 9 September 2022.

VI. The opponent (respondent) replied to the appeal and raised objections against the main request based on grounds of opposition under Article 100(a) EPC (lack of novelty and inventive step in the context of Articles 54 and 56 EPC), Article 100(b) EPC (insufficiency of disclosure) and Article 100(c) EPC (added subject-matter). It also objected to the admission of auxiliary requests 1 to 5 and 8 to 22.

VII. Both parties submitted further letters. By letter dated 7 February 2024, the appellant filed new documents D20 and D21.

VIII. The parties were summoned to oral proceedings as requested. In the communication of the Board of Appeal pursuant to Article 15(1) RPBA, the board set out its preliminary opinion on several issues.

IX. All parties replied to the communication.

X. Oral proceedings before the board took place on 5 August 2025.

At the end of the oral proceedings, the Chairwoman announced the board's decision.

XI. Claim 1 of the main request and of auxiliary request 6 reads as follows:

"An immunogenic composition comprising two different meningococcal fHBP antigens, both of which are adsorbed to aluminium hydroxyphosphate adjuvant, wherein (i) both of the meningococcal fHBP antigens have an isoelectric point between 5.0 and 7.0, (ii) the aluminium hydroxyphosphate adjuvant has a point of zero charge between 5.0 and 7.0, and (iii) the composition includes a buffer to maintain pH in the range of 5.0 to 7.0."

XII. Claim 1 of auxiliary request 7 reads as follows (amendments compared with claim 1 of the main request highlighted by the board):

"1. An immunogenic composition comprising two different meningococcal fHBP antigens, both of which are adsorbed to aluminium hydroxyphosphate adjuvant, wherein (i) both of the meningococcal fHBP antigens have an isoelectric point between 5.0 and 7.0, (ii) the aluminium hydroxyphosphate adjuvant has a point of zero charge between 5.0 and 7.0, and (iii) the composition includes a buffer to maintain pH in the range of 5.0 to 7.0, wherein each fHBP antigen is at least 85% adsorbed."

XIII. Claim 1 of auxiliary request 17 reads as follows (amendments compared with claim 1 of the main request highlighted by the board):

"1. An immunogenic composition comprising two different meningococcal fHBP antigens, both of which are adsorbed to aluminium hydroxyphosphate adjuvant, wherein (i) both of the meningococcal fHBP antigens have an isoelectric point between 5.0 and 7.0, (ii) the aluminium hydroxyphosphate adjuvant has a point of zero charge between 5.0 and 7.0, and (iii) the composition includes a histidine buffer to maintain pH in the range of 5.0 to 6.0 ~~7.0~~."

XIV. The wording of auxiliary requests 1 to 5, 8 to 16 and 18 to 22 is available from the electronic file.

XV. Reference is made to the following documents:

D1: WO 2007/127665 A2

D5: A. Mascioni et al., J Biol Chem 284(13), 2009, 8738-8746

D5a: Supplementary Materials to document D5, supplemental Figure 1 to 4, 5 pages

D5b: Annex A, filed by the respondent with the notice of opposition dated 5 February 2021, 3 pages

D8: N. Baylor et al., Vaccine 20 (Suppl 3), 2002, S18-S23

D9: Handbook of Pharmaceutical Excipients, 5th edition, R. Rowe et al. (eds), 2006, Chapter "*Aluminium Phosphate Adjuvant*", pages 40-41

D10: "Aluminium adjuvants" Product profile, brochure by Chemtrade, 2019, 2 pages

D11: WO 03/063766 A2

D12: WO 2004/094596 A2

D13: WO 2004/048404 A2

D15: Experimental report, submitted as document D17 by letter dated 19 September 2018, 2 pages

D19: S. Seeber et al., Vaccine 9(3), 1991, 201-203

XVI. The appellant's arguments, where relevant to the decision, are summarised as follows:

(a) Main request (patent as granted)

Inventive step – Articles 100(a) and 56 EPC – claim 1

Document D1 represented the closest prior art. The subject-matter of claim 1 differed from the immunogenic composition disclosed in Table 8 of document D1 in that (a) the composition comprised two factor H binding protein (fHBP) antigens, (b) the two meningococcal fHBP antigens had an isoelectric point (pI) between 5.0 and 7.0 and (c) the aluminium hydroxyphosphate adjuvant had a point of zero charge (PZC) between 5.0 and 7.0. (d) The absence of a surfactant represented a further difference to be considered since the good adsorption observed in document D1 would be due to the presence of the polysorbate 80 surfactant.

As evidenced by the data in the patent, the technical effect was the excellent adsorption of the antigens to the aluminium hydroxyphosphate adjuvant. This was confirmed by the additional data in document D15.

The objective technical problem was an alternative way of providing an immunogenic meningococcal fHBP composition having good adsorption to the aluminium hydroxyphosphate adjuvant and having a second fHBP antigen which is well adsorbed.

In light of the entire patent specification, particularly paragraphs [0001] and [0122], the skilled person would understand claim 1 as being directed to a therapeutic immunogenic composition for human use, specifically against meningococcal infection. The patent provided inventive teaching by clarifying the relationship between the pI of the antigens and the PZC of the aluminium hydroxyphosphate adjuvant, which enabled efficient adsorption, teaching which was not derivable from the prior art. Given the risk of adverse reactions and interference with other antigens, the skilled person would have been motivated to avoid unnecessary excipients such as surfactants or high adjuvant concentrations.

In its inventive step objection, the respondent had to refer to a number of documents in addition to D1 to arrive at a composition according to claim 1.

Documents D11 to D13 were cited as providing two fHBP antigens with a pI between 5 and 7; however, the two documents did not unequivocally teach the use of multiple fHBP antigens, since they comprised several examples and disclosures in which only a single antigen had been adsorbed in the composition. Moreover,

documents D11 and D12 listed numerous fHBP antigens, some within the claimed pI range, others not. Document D5b (page 2) demonstrated, for instance, that antigen 8529, listed in documents D11 (Table XI, page 103) and D12 (Table XI, page 101), had a calculated pI of 7.23, which was outside the claimed range.

The skilled person would not have considered document D5, either, since it related just to a physical characterisation of the fHBP LP2086 protein, but was not looking at fHBP for use in an immunogenic composition to be administered to humans. Document D13 mentioned the pI of fHBP MC58 only once on page 31, line 32.
Even if combining the teaching of document D1 with that in document D11, D12 or D13, the skilled person did not know the pI of the antigen to be used and would not necessarily have selected a pI within the claimed range.

Contrary to the respondent's assertion, it had not been common general knowledge that aluminium hydroxyphosphate adjuvants inherently had a PZC between 5.0 and 7.0. Documents D8, D9, D10 and D19 demonstrated variability depending on composition and manufacturing conditions. Notably, document D9, the closest document in terms of publication date, disclosed PZC values of 4.6 to 5.6, which were not fully within the claimed range. Document D10, being post-published, was not relevant under Article 56 EPC. The appellant stressed that the prior art lacked guidance for selecting a PZC within the claimed range, making the selection non-obvious and inventive.

Starting from the disclosure of document D1, the skilled person would have had no incentive or guidance

from the prior art to seek an alternative fHBP immunogenic composition, especially since D1 already disclosed 100% adsorption.

(b) Auxiliary request 6

Inventive step – Article 56 EPC – claim 1

Claim 1 of auxiliary request 6 was identical to claim 1 of the main request, and thus the arguments set out for the main request also applied to claim 1 of auxiliary request 6.

(c) Auxiliary request 7

Inventive step – Article 56 EPC – claim 1

Document D1 represented the closest prior art. In addition to the differences identified for claim 1 of the main request, claim 1 of auxiliary request 7 additionally differed on account of the requirement that each fHBP antigen was at least 85% adsorbed.

The appellant did not define a separate objective technical problem for the subject-matter of claim 1 of auxiliary request 7.

The patent demonstrated in paragraph [0160] that a fusion protein of three fHBP antigens (v1+v2+v3), i.e. including two different fHBP antigens (v2 and v3) with a pI between 5.0 and 7.0, was at least 85% adsorbed across the pH range of 5 to 7.

Document D15 demonstrated on page 2 that, under the conditions PZC 7 and pH 7 or 5, the (non-fused) mixture of v1+v2+v3 was at least 89% adsorbed to the adjuvant,

implying a high adsorption level for all antigens. The data in document D15 also demonstrated that fHBP antigen v1 (pI 7.4, i.e. outside the claimed pI range of between 5.0 and 7.0) adsorbed less efficiently compared with the other two fHBP antigens v2 (pI 5.8) and v3 (pI 6.1). Therefore, it was evident that the two different fHBP antigens having a pI within the claimed range of between 5.0 and 7.0 exhibited very high adsorption.
The 74% adsorption observed for the mixture of the v1+v2+v3 fHBP antigens under conditions of PZC = 5 and pH = 5 was below the claimed range of at least 85%; however, based on the indications in the patent, the skilled person was taught how to modify the conditions to achieve the at least 85% adsorption required.

Paragraph [0158] of the patent clearly demonstrated that the highest adsorption was achieved in the middle of the claimed pH range and fell at both ends of this pH range. From this, the skilled person would have understood the need to work in the middle of the claimed range of pH 5.0 to 7.0 to achieve at least 85% adsorption.

Reference 9, paragraph [0005] of the patent indicated that a tandem (bivalent) fHBP antigen did not adsorb well to aluminium hydroxyphosphate. Therefore, the skilled person would not have expected to obtain high adsorption levels when including more than one fHBP antigen.

The claimed subject-matter was a non-obvious alternative to the disclosure of document D1, which achieved 100% adsorption but only for a single fHBP antigen.

(d) Admission of auxiliary requests 1 to 5 and 8 to 13

Since auxiliary requests 1 to 5 and 8 to 13 were admitted into the opposition proceedings, and since Article 12(2) RPBA indicated that an appeal was to be directed to the requests on which the decision under appeal was based, auxiliary requests 1 to 5 and 8 to 13 were part of the appeal proceedings.

The opposition division had indicated its willingness to discuss these auxiliary requests, and excluding them from discussion at the oral proceedings before the opposition division had been due to time constraints and not because they were not admitted into the proceedings.

In view of the opposition division's failure to provide a reasoned decision for why auxiliary requests 3 to 13 (which were identical to auxiliary requests 1 to 5 and 8 to 13 as resubmitted with the statement of grounds of appeal) had not been considered allowable, it had not been possible in the statement of grounds of appeal to address how these requests overcame the opposition division's reasons.

(e) Admission of auxiliary requests 14 to 22

Auxiliary requests 14 to 22 had been filed in response to new issues raised by the opposition division during the oral proceedings, particularly on the grounds of inventive step and sufficiency of disclosure. These issues had not been clearly raised in the written opposition proceedings. These requests aimed to address the opposition division's reasons, which could not reasonably have been addressed earlier.

(f) Request for remittal (Article 111(1) EPC) in view of a procedural violation (Article 113(1) EPC)

The opposition division had committed a substantial procedural violation by failing to provide a reasoned decision on auxiliary requests 1 to 5 and 8 to 13, which had been formally maintained and renumbered to auxiliary requests 3 to 13 during the oral proceedings before the opposition division. The absence of reasoning for these requests had deprived the appellant of a proper opportunity to understand and challenge the decision. Consequently, the decision was legally deficient and the case was to be remitted to the opposition division for a reasoned decision on each of the maintained auxiliary requests 1 to 5 and 8 to 13.

XVII. The respondent's arguments, where relevant to the decision, are summarised as follows:

(a) Main request (patent as granted)

Inventive step – Articles 100(a) and 56 EPC – claim 1

Document D1 represented the closest prior art. The subject-matter of claim 1 differed from the immunogenic composition disclosed in Table 8 of document D1 in that (a) the composition comprised two fHBP antigens, (b) the two fHBP antigens had a pI between 5.0 and 7.0 and (c) the aluminium hydroxyphosphate adjuvant had a PZC between 5.0 and 7.0.

The data in the patent did not provide a credible technical effect across the scope of claim 1 and especially failed to provide any evidence for a mixture of two different fHBP antigens.

The supplementary data in document D15 also failed to provide conclusive evidence that adsorption of an fHBP antigen to aluminium hydroxyphosphate was enhanced by the presence of a second antigen with a pI in the same range (5.0 to 7.0).

The objective technical problem was the provision of a mere alternative meningococcal fHBP composition or method.

The scope of claim 1 was overly broad, as it encompassed general immunogenic compositions not limited to vaccination, lacked any definition of adjuvant-to-fHBP antigen ratio or adsorption level, did not exclude surfactants, and did not require structurally distinct fHBP antigens.

The combination of pI, PZC and pH ranges in claim 1 did not result in a synergistic or unexpected technical effect. Each parameter was individually arbitrary and known from the prior art. The patent did no more than provide a scientific rationale for what had already been observed in the prior art such as document D1. The subject-matter of claim 1 did not involve an inventive step in view of the disclosure in document D1 and D5, D11, D12 or D13, for specific fHBP antigen sequences and the use of multivalent vaccines, and common general knowledge on aluminium hydroxyphosphate having a PZC within the claimed range as evidenced by documents D8, D9, D10 or D19.

(b) Auxiliary request 6

Inventive step – Article 56 EPC – claim 1

Claim 1 of auxiliary request 6 was identical to claim 1 of the main request and thus lacked an inventive step for the same reasons.

(c) Auxiliary request 7

Inventive step – Article 56 EPC – claim 1

Claim 1 of auxiliary request 7 differed from claim 1 of the main request and auxiliary request 6 on account of the additional requirement that each fHBP antigen was at least 85% adsorbed.

As for claim 1 of the main request, the patent did not provide any examples falling within the scope of claim 1. The PZC of the aluminium hydroxyphosphate used in the experiment in paragraph [0160] was not defined. The supplemental data in document D15 did not demonstrate that two fHBP antigens, having a pI between 5.0 to 7.0, were each adsorbed to at least 85% when applying the claimed parameters:
Under conditions of PZC 5 and pH 5, neither the individual antigens nor the mixture of v1+v2+v3 fHBP antigens exhibited adsorption above 74%. In experiments where the mixture of three fHBP antigens exhibited adsorption above 85%, it had not been demonstrated that each of the two fHBP antigens with a pI between 5.0 and 7.0 individually reached the required adsorption level.
For the v1+v2+v3 mixture the adsorption levels of the individual fHBP antigens had not been determined, and

so it could not be ruled out that one of the fHBP antigens having a pI between 5.0 to 7.0 failed to meet the 85% threshold.

Moreover, document D1 already demonstrated 100% adsorption for a single fHBP antigen. There was nothing in the patent or in the prior art on file to suggest that a second, different fHBP antigen would not adsorb equally well under the same conditions. The cut-off level of at least 85% adsorption was totally arbitrary and not linked to any demonstrated technical effect.

(d) Admission of auxiliary requests 1 to 5 and 8 to 13

Contrary to the requirements of Article 12(3) RPBA, the statement of grounds of appeal did not address how auxiliary requests 1 to 5 and 8 to 13 overcame the reasons for lack of inventive step and sufficiency of disclosure given in the decision under appeal. Therefore, these requests had not been substantiated and were not to be admitted.

(e) Admission of auxiliary requests 14 to 22

Auxiliary requests 14 to 22 had been filed late and were not to be admitted into the proceedings. The issues addressed by these requests, i.e. namely inventive step and sufficiency of disclosure, had already been raised during the written opposition proceedings. Moreover, these requests were not *prima facie* suitable for overcoming the objections raised against the higher-ranking requests.

(f) Request for remittal (Article 111(1) EPC) in view of a procedural violation (Article 113(1) EPC)

As evidenced by point 19 of the decision under appeal and paragraph 54 of the corrected minutes of the oral proceedings before the opposition division, the appellant had the opportunity to present arguments for any of auxiliary requests 3 to 11 (current auxiliary requests 1 to 5 and 8 to 13). Therefore, no procedural violation occurred which could justify remittal.

XVIII. The parties' requests, where relevant to the decision, were as follows:

(a) The appellant requested
- that the decision under appeal be set aside and that the patent be maintained on the basis of the claims as granted (main request), or, alternatively, that the case be remitted to the opposition division on the basis of auxiliary requests 1 to 5 and 8 to 13 (auxiliary requests 3 to 13 underlying the decision under appeal) in view of a substantial procedural violation,
- that, in the alternative, the patent be maintained in amended form on the basis of one of the sets of claims according to auxiliary requests 1 to 22, and
- that auxiliary requests 14 to 22 be admitted.

(b) The respondent requested
- that the appeal be dismissed and
- that auxiliary requests 1 to 5 and 8 to 22 not be admitted into the appeal proceedings.

Reasons for the Decision

Main request (patent as granted)

Claim construction - claim 1

1. Claim 1 is directed to an immunogenic composition comprising two different meningococcal factor H binding protein (fHBP) antigens, both of which are adsorbed to aluminium hydroxyphosphate adjuvant, with further parameters relating to the isoelectric point (pI) of the fHBP antigens, the point of zero charge (PZC) of the adjuvant, and the pH of the buffer.

2. The term "comprising" is to be construed, in line with established case law (see Case Law of the Boards of Appeal, 11th edition, 2025, II.A.6.2), as not excluding the presence of other elements or steps not explicitly listed in the claim, such as surfactants in the present case. In this regard, the board notes that the patent itself explicitly envisages e.g. the inclusion of surfactants such as Tween 80 (see e.g. paragraph [0135]). Accordingly, the claimed immunogenic composition is not limited in this respect.

3. The expression "immunogenic composition" is understood to denote a composition capable of eliciting any kind of immune response. This functional definition does not impose any structural limitations, nor does it require a defined level or type of immune response.

4. The phrase "two different meningococcal fHBP antigens" requires the presence of two distinct meningococcal fHBP antigens. The claim does not, however, specify that the antigens must originate from different subfamilies or serotypes, nor does it require any

particular structural or functional relationship between them.

5. The claim requires that both fHBP antigens are adsorbed to the aluminium hydroxyphosphate adjuvant. A quantitative threshold of adsorption is not defined.

Inventive step - Articles 100(a) and 56 EPC - claim 1

Closest prior art

6. Both parties considered document D1 to represent the closest prior art.

7. Document D1 generally relates to the fields of immunology, bacteriology, vaccine formulation, protein stability and process development. More particularly, it relates to novel formulations which inhibit precipitation of immunogenic compositions (page 1, paragraph 1). Example 5 discloses the preparation of an immunogenic composition comprising a *Neisseria meningitidis* 2086 protein [also known as factor H binding protein (fHBP)]. The last row of Table 8 demonstrates that formulating 120 µg/ml of the fHBP antigen in 5 mM succinate buffer pH 6.0 containing 150 mM NaCl, 0.02% polysorbate 80 and 0.25 mg Al/ml of $AlPO_4$ resulted in 100% adsorption to the adjuvant. Page 25, line 13 ff. provides references to different prior-art documents, including documents D11 and D12 on file, disclosing various *N. meningitidis* 2086 proteins.

Differences

8. The parties agree that the subject-matter of claim 1 differs from the immunogenic composition disclosed in the last row of Table 8 of document D1 in that

(a) the composition comprises two different fHBP antigens,
(b) the two fHBP antigens have an isoelectric point (pI) between 5.0 and 7.0 and
(c) the aluminium hydroxyphosphate adjuvant has a point of zero charge (PZC) between 5.0 and 7.0.

9. The immunogenic composition according to claim 1 does not exclude the presence of further components (see point 2. above). Therefore, contrary to the appellant's argument, the presence of a surfactant cannot be considered a distinguishing feature over the disclosure in document D1.

Technical effect(s) of the differences

Evidence in the patent

10. The patent provides adsorption data (paragraphs [0154] to [0164]) for formulations at different pH values, in various buffers, and for three distinct fHBP antigens with isoelectric points (pI) of 7.4, 5.8 and 6.1, as well as for a fusion protein comprising these three fHBP antigens; however, no data are provided for an immunogenic composition comprising two different meningococcal fHBP antigens as claimed.

Evidence in document D15

11. The post-published supplementary document D15 investigates the adsorption of three meningococcal fHBP antigens (v1, v2, v3), with different pIs (7.4, 5.8 and 6.1 respectively), either individually or as a mixture, to aluminium hydroxyphosphate adjuvants with PZCs of 5 and 7, as well as to aluminium hydroxide adjuvant (PZC 11), across a range of pH values. Adsorption was

assessed by measuring the amount of unbound protein remaining in the supernatant after incubation and centrifugation.

12. The board notes that the method described in document D15 (see paragraph "*Adsorption results*") only permits total protein adsorption to be determined and does not allow conclusions to be drawn regarding the adsorption behaviour of each individual fHBP antigen. Consequently, it cannot be inferred from the data in document D15 that the v1+v2+v3 mixture of three fHBP antigens leads to improved adsorption of each individual protein, in particular of fHBP antigens having a pI between 5.0 and 7.0, i.e. v2 and v3.

As argued by the respondent, it cannot be ruled out that one or more of the included fHBP antigens exhibits a higher degree of adsorption for reasons unrelated to their intrinsic properties, such as the higher adjuvant concentration in the triple-antigen formulation (0.5 mg/ml) compared with the single-antigen preparations (0.222 mg/ml), which may have influenced the measured overall adsorption.

13. As discussed by the parties, the total adsorption values of 74% (with an aluminium hydroxyphosphate adjuvant having a PZC of 5, formulated at pH 5), 89% (with an aluminium hydroxyphosphate adjuvant having a PZC of 7, formulated at pH 7) and 94% (with an aluminium hydroxyphosphate adjuvant having a PZC of 7, formulated at pH 5) observed in document D15 for the v1+v2+v3 mixture with aluminium hydroxyphosphate adjuvant may arise from a range of individual adsorption profiles. The data do not allow conclusions to be drawn regarding the adsorption level of each

antigen separately, and thus do not demonstrate that all three antigens are highly adsorbed.

14. The appellant submitted that a total adsorption of approximately 90% to the aluminium hydroxyphosphate adjuvant presupposed that each of the three fHBP antigens was efficiently adsorbed. For instance, a composition in which v1 and v3 exhibited 100% adsorption to the adjuvant, while v2 was only 25% adsorbed, would yield a total adsorption level below 90%.

15. The respondent argued that, based on the evidence in the table on page 18 of the patent, it was apparent that the fHBP antigen v2, having a pI of 5.8, exhibited the lowest adsorption at pH 7 ("<25%"). Contrary to this, fHBP antigen v1, with a pI of 7.4 (i.e. outside the claimed range), exhibited good adsorption of 40 to 60% at pH 7.

The data in document D15 demonstrated that, with an adjuvant having a PZC of 5 at pH 5, none of the three antigens, either individually or in combination, achieved an adsorption exceeding 74%. This was well below the high adsorption threshold of 85%.

Given that individual adsorption within the mixture could not be assessed, the total adsorption of 74% at pH 5, PZC 5 might stem from complete adsorption of fHBP antigens v1 and v2 (representing 66% of the total protein), with fHBP antigen v3 contributing only 8% to the total protein, which corresponds to an adsorption level of only 24% for fHBP antigen v3. Such a level of adsorption could not be considered high.

Similarly, the 89% total adsorption observed for the mixture of fHBP antigens using an aluminium hydroxyphosphate adjuvant with a PZC of 7 at pH 7 could be explained by full adsorption of fHBP antigens v1 and v3 (together representing 66% of the total protein), while fHBP antigen v2 may have adsorbed at a level below 85%.

16. Therefore, the data in document D15 do not allow the conclusion to be drawn that each individual fHBP antigen is highly adsorbed. As noted in paragraphs [0020], [0051], [0159] and [0161] of the patent, adsorption levels of ≥85% are considered indicative of high adsorption; however, document D15 provides only total adsorption values and does not disclose individual adsorption levels. Consequently, it cannot be established that all fHBP antigens, in particular those having a pI between 5.0 and 7.0, i.e. v2 and v3, in the mixture meet the adsorption levels threshold of 85%.

Conclusion from the evidence in the patent and document D15

17. The distinguishing features, i.e. the presence of two different fHBP antigens with pIs between 5.0 and 7.0, and an aluminium hydroxyphosphate adjuvant with a PZC between 5.0 and 7.0, have not been demonstrated to result in a technical effect over the immunogenic composition disclosed in the last row of Table 8 of document D1, which already achieves 100% adsorption to aluminium hydroxyphosphate adjuvant.

Crucially, none of the examples in the patent or in document D15 tests a composition as defined in claim 1. The available data relate to single fHBP antigens, a

fusion protein of three fHBP antigens or a mixture of three fHBP antigens, and do not allow conclusions to be drawn about the individual adsorption behaviour of the fHBP antigens under consideration.

18. In view of the fact that the patent does not disclose any examples falling within the scope of claim 1, and in line with established case law (see Case Law of the Boards of Appeal, 11th edition, 2025, I.D.4.3.1 and I.D.4.3.2), the board considers that no technical effect has been credibly demonstrated for the claimed subject-matter. In the absence of comparative data demonstrating that the distinguishing features result in an improvement over the closest prior art, any alleged advantage cannot be taken into account when formulating the objective technical problem.

Objective technical problem

19. The parties defined different objective technical problems. The appellant suggested that the objective technical problem was an alternative way of providing an immunogenic meningococcal fHBP composition having good adsorption to the aluminium hydroxyphosphate adjuvant and having a second fHBP antigen which is well adsorbed.

Since no technical effect has been demonstrated to arise from the distinguishing technical features (see points 11. to 19. above), the objective technical problem cannot take into account the level of adsorption of antigens.

20. The board considers that the objective technical problem has to be formulated in a less ambitious manner, namely as that of providing a further

immunogenic composition comprising fHBP antigen, aluminium hydroxyphosphate adjuvant and a buffer.

21. The claimed solution is an immunogenic composition comprising two different meningococcal fHBP antigens as defined in claim 1.

Obviousness

22. The addition of a second fHBP antigen would have been a routine measure, particularly in the context of vaccine development, where combining antigens from different variants or subfamilies of a pathogen is a well-established strategy to broaden immune coverage. Document D1 itself refers, on page 25, lines 13 to 19, to prior-art documents such as D11 and D12, which disclose various fHBP antigens. Therefore, the skilled person, considering the intended use of the composition as an immunogenic composition, potentially for developing a vaccine (see paragraph [0001] of the patent and page 1, lines 12 to 15 of document D1), would have been motivated to incorporate a further fHBP antigen into the composition.

23. The concept of using immunogenic compositions comprising antigens from multiple *N. meningitidis* variants or subfamilies to induce broader protection was already known in the art (see D5, title and page 8738, right-hand column, lines 10–16; and D13, page 1, lines 4–5 and 29–30 and page 2, lines 5–7). In light of this, the inclusion of a second fHBP antigen does not go beyond what the skilled person would have done using routine measures.

24. As discussed in points 10. to 18. above, the composition comprising two fHBP antigens does not give

rise to any surprising technical effect over the closest prior art. In particular, there is no experimental evidence demonstrating that a composition limited to two antigens within the claimed pI range results in improved adsorption to aluminium hydroxyphosphate adjuvant having the claimed PZC range, or enhanced immunogenicity.

Moreover, the parameter ranges defined, i.e. (i) a range of pI between 5.0 and 7.0 for the fHBP antigens, (ii) a range of PZC between 5.0 and 7.0 for the aluminium hydroxyphosphate adjuvant, and (iii) a range of pH value between 5.0 and 7.0 to be maintained by the buffer, do not appear to have been purposively selected. Instead these ranges fall within the usual working conditions for protein adsorption to aluminium hydroxyphosphate adjuvants.

25. As evidenced in documents D8 (page S18,left-hand column, paragraph 2, although strictly speaking disclosing only the pI between 5 to 7), D9 (page 40; PZC 4.6 to 5.6) and D19 (page 201, bridging paragraph; PZC 4.0) demonstrating common general knowledge, aluminium hydroxyphosphate adjuvants commonly exhibit PZC values between 4.0 and 7.0, depending on their composition and manufacturing conditions.

Document D10, which was also cited by the respondent in that context, cannot be considered to reflect the skilled person's common general knowledge on the relevant date, as it was published only after that date.

26. Similarly, and as confirmed by the calculated pI values in document D5b, fHBP antigens as e.g. disclosed in

documents D11 and D12 include variants with pI values falling within the claimed range of 5.0 to 7.0.

27. The use of a buffer to maintain the pH within the range of 5.0 to 7.0 lies within the usual ranges employed in immunogenic compositions comprising protein antigens.

28. In the absence of any demonstrated advantage over the prior art, the selection of these parameters is regarded as arbitrary.

29. As already mentioned in points 2. and 9. above, the appellant's argument that the high adsorption demonstrated in Table 8 of document D1 was due to the presence of a surfactant is irrelevant to the assessment of inventive step, as neither adsorption efficiency nor achieving high adsorption without a surfactant are distinguishing features over the immunogenic composition disclosed in the last row of Table 8 of document D1. The term "comprising" does not exclude the presence of additional components such as surfactants, and the patent itself envisages their inclusion (see paragraph [0135]).

30. Accordingly, the combination of the disclosure in document D1 with the teaching in any of documents D5, D11, D12 or D13, in light of the common general knowledge reflected by documents D8, D9 and D19 for PZC values of the aluminium hydroxyphosphate adjuvant, would have led the skilled person to the claimed subject-matter without them exercising inventive skill. Consequently, the subject-matter of claim 1 does not involve an inventive step within the meaning of Article 56 EPC.

Auxiliary request 6

Inventive step - Article 56 EPC - claim 1

31. Claim 1 of auxiliary request 6 is identical to claim 1 of the main request, and so the subject-matter of claim 1 of auxiliary request 6 lacks an inventive step under Article 56 EPC for the same reasons as discussed for claim 1 of the main request.

Auxiliary request 7

32. Claim 1 of auxiliary request 7 is identical to claim 1 of the main request and auxiliary request 6, except that it additionally requires that each fHBP antigen is at least 85% adsorbed.

Inventive step - Article 56 EPC - claim 1

Closest prior art

33. D1 is considered to represent the closest prior art (summarised in point 7. above).

Differences

34. The parties agree that the subject-matter of claim 1 differs from the immunogenic composition disclosed in Table 8 of document D1 in that
(a) the composition comprises two different fHBP antigens,
(b) the two fHBP antigens have a pI between 5.0 and 7.0,
(c) the aluminium hydroxyphosphate adjuvant has a PZC between 5.0 and 7.0, and

(d) the second fHBP antigen also needs to be at least 85% adsorbed.

35. As explained in the context of the main request, the presence of a surfactant in the composition used in document D1 is not considered to represent a difference (see point 9. above).

Technical effect(s)

36. As explained in points 10. to 18. in the context of the main request, there is no evidence on file that differences (a) to (c) would be associated with a surprising technical effect.

37. There is also no evidence on file for an immunogenic composition in which two fHBP antigens with a pI between 5 to 7 are each at least 85% adsorbed; see the detailed discussion in points 12. to 16. above. In other words, there is no evidence that the parameters of claim 1 would automatically lead to high adsorption of at least 85% of the two different fHBP antigens. On the other hand, neither the patent nor the documents on file suggest that a second, different fHBP antigen would not adsorb equally well under the parameters defined in claim 1 or those used in the experimental setup of Example 5 of document D1.

38. In this context, the appellant referred to paragraph [0009] of the patent, which states that "*The use of aluminium hydroxyphosphate can avoid the need to use aluminium hydroxide, and the inventors' techniques avoid the inefficient adsorption described in reference 9. The adsorption techniques are particularly useful for compositions which include multiple fHBP*

variants.", as establishing a prejudice against adding more than one antigen in a composition.

Paragraph [0005] of the patent also cites reference 9 as reporting that a tandem fHBP protein was purified and mixed with aluminium phosphate as an adjuvant, but it did not adsorb well to the adjuvant.

39. Apart from the fact that reference 9 relates to an fHBP tandem protein, i.e. a fusion protein of fHBP antigens (see point 40. below), the other experimental conditions used in reference 9 are not disclosed. Since reference 9 is not part of the present appeal proceedings, it cannot be relied upon to establish a technical prejudice.

Moreover, according to established case law, a prejudice cannot be demonstrated to have existed at the relevant time by making reference to a statement in a single document, since the technical information in a patent specification or a scientific article might be based on special premises or on the personal view of the author (Case Law of the Boards of Appeal, 11th edition, 2025, I.D.10.2.2).

Consequently, the statement in paragraphs [0005] and [0009] of the patent cannot establish a prejudice in the art against adding more than one fHBP antigen to the immunogenic composition.

40. The v1+v2+v3 fusion protein disclosed in paragraph [0160] of the patent is a single, unified protein entity exhibiting biochemical properties distinct from those of the individual unfused v1, v2 and v3 proteins. Therefore, the data in the patent do not demonstrate that two different fHBP antigens having a pI between 5

and 7 are each at least 85% adsorbed to the aluminium hydroxyphosphate adjuvant.

Objective technical problem

41. The objective technical problem remains the same as defined in the context of claim 1 of the main request, i.e. that of providing a further immunogenic composition comprising fHBP antigen, aluminium hydroxyphosphate adjuvant and a buffer.

The claimed solution is an immunogenic composition comprising two different meningococcal fHBP antigens, wherein each fHBP antigen is at least 85% adsorbed as defined in claim 1.

Obviousness

42. Given that the patent does not demonstrate that two different fHBP antigens each achieve at least 85% adsorption to aluminium hydroxyphosphate adjuvant, and that there is nothing in the prior art suggesting that the addition of a further fHBP antigen to the immunogenic composition disclosed in the last row of Table 8 of document D1 would adversely affect adsorption, the claimed subject-matter does not to involve an inventive step for the same reasons as set out above for claim 1 of the main request (see points 22. to 30. above).

Admission of auxiliary requests 1 to 5 and 8 to 13

43. According to Article 12(2) RPBA the primary object of the appeal proceedings is to review the decision under appeal in a judicial manner. Therefore, a party's appeal case should be directed to the requests, facts,

objections, arguments and evidence on which the decision under appeal was based. Article 12(3) RPBA requires that the statement of grounds of appeal and the reply must contain a party's complete appeal case. It must set out clearly and concisely the reasons why it is requested that the decision under appeal be reversed, amended or upheld, and should specify expressly all the requests, facts, objections, arguments and evidence relied on (see Case Law of the Boards of Appeal, 11th edition, 2025, V.A.3.2.1, V.A.4.3.5.a) and V.A.4.3.5.b)).

According to Article 12(5) RPBA, the board has discretion not to admit any part of a submission by a party which does not meet the requirements in Article 12(3) RPBA (see Case Law of the Boards of Appeal, 11th ed., 2025, V.A.4.3.5.d)).

44. Auxiliary requests 1 to 5 and 8 to 13 are identical to auxiliary requests 3 to 13 underlying the decision under appeal. While this satisfies the formal requirement of Article 12(2) RPBA, this is not the only criterion to be considered when deciding on the admission of a claim request. In accordance with Article 12(3) RPBA, the appellant is also required to substantiate in the statement of grounds of appeal how these requests overcome the objections that formed the basis of the decision under appeal.

45. Auxiliary requests 1 to 5 were first submitted with the appellant's observations on the notice of opposition (dated 2 July 2021).

Auxiliary requests 8 to 13 were first submitted with the appellant's letter dated 9 September 2022, in reaction to the opposition division's preliminary

opinion that claims 4 and 7 of the main request extended beyond the content of the application as filed (Article 100(c) EPC).

46. While the appellant provided a basis in the application as filed for the amendments in auxiliary requests 1 to 5 and 8 to 13, no explanation was given for how the amendments addressed the opponent's objections under Articles 100(a) and 56 EPC.

47. In the absence of substantiation by the appellant during the written opposition proceedings how the amendments in auxiliary requests 1 to 5 and 8 to 13 would overcome the, e.g. inventive step, objections, and given the appellant's choice to formally maintain these auxiliary requests during oral proceedings before the opposition division without further discussion (see point 54 of the corrected minutes of the oral proceedings before the opposition division and point 19. of the decision under appeal), the opposition division was not in a position to provide detailed reasoning on inventive step for each of auxiliary requests 1 to 5 and 8 to 13. Indeed, in the absence of specific arguments regarding these sets of claims, the appellant could not reasonably expect the reasoning in the decision under appeal to go beyond that provided for auxiliary requests 1 and 2 (now auxiliary requests 6 and 7).

48. The appellant did not remedy this lack of substantiation in the statement of grounds of appeal which also lacks a reasoned explanation as to how the amendments in auxiliary requests 1 to 5 and 8 to 13 address the reasons set out in the decision under appeal that led the opposition division to conclude that the then auxiliary request 1 (now auxiliary

request 6; see point 16 of the decision under appeal) lacked inventive step under Article 56 EPC and that the then auxiliary request 2 (now auxiliary request 7; see point 18 of the decision under appeal) did not meet the requirements of Article 83 EPC.

49. Only in reaction to the objection raised in point 4.1 of the respondent's reply to the statement of grounds of appeal regarding lack of substantiation did the appellant provide arguments as to how auxiliary requests 2 to 5 and 8 to 13 addressed the reasoning set out in the decision under appeal. The appellant's case was thus filed in a piecemeal manner and was only completed nine months after the statement of grounds of appeal was filed. This gave rise to a surrejoinder, to which the appellant filed a further substantial reply. Such a piecemeal approach is exactly what Article 12(3) and (5) RPBA is intended to prevent.

50. Accordingly, the appellant failed to present a complete appeal case within the meaning of Article 12(3) RPBA. In the present case auxiliary requests 1 to 5 and 8 to 13 could and should have already been substantiated during the written opposition proceedings. The appellant's failure to do so, followed by the absence of any substantiation in the statement of grounds of appeal, amounts to a repeated failure to present a complete case at the appropriate procedural stages. The board therefore exercised its discretion under Article 12(5) RPBA and decided not to admit auxiliary requests 1 to 5 and 8 to 13 into the appeal proceedings.

Admission of auxiliary requests 14 to 22

51. The appellant argued that auxiliary requests 14 to 22 had first been filed with the statement of grounds of

appeal in reaction to new issues raised by the opposition division during the oral proceedings and subsequently reasoned in the decision under appeal, in particular concerning inventive step and disclosure of the invention.

52. The board notes that, in the statement of grounds of appeal, the appellant provided arguments relating to the admission of auxiliary requests 14 to 22 and their basis in the application as filed (see point 7.1 of the statement of grounds of appeal); however, the appellant failed to specifically address the opposition division's reasoning on inventive step, in particular the issues concerning the absence of a demonstrated technical effect such as an enhanced adsorption of a fHBP antigen. The arguments provided by the appellant did not substantiate how the amendments would overcome the opposition division's reasons on inventive step and disclosure of the invention.

53. Only in reaction to the respondent's reply to the statement of grounds of appeal did the appellant provide arguments on how auxiliary requests 14 to 22 were intended to overcome objections of inventive step and disclosure of the invention which were already on file during the written opposition proceedings.

54. Moreover, the amendments introduced in auxiliary requests 14 to 22 incorporate features taken from the description, such as fHBP antigens having a pI between 5.2 and 6.2 (auxiliary requests 15, 18, 19, 21 and 22), histidine buffer (auxiliary requests 14, 17 and 19 to 22) and each fHBP antigen being at least 85% adsorbed (auxiliary requests 20 and 21).

55. Given that the appellant failed to provide its complete case for auxiliary requests 14 to 22 with the statement of grounds of appeal, these auxiliary requests do not comply with what is set out in Article 12(3) RPBA. Consequently, the board decided not to admit auxiliary requests 14 to 22 into the appeal proceedings pursuant to Article 12(5) RPBA.

Request for remittal (Article 111(1) EPC) in view of a procedural violation (Article 113(1) EPC)

56. Since the board decided not to admit any of auxiliary requests 1 to 5 and 8 to 22, the appellant's request for remittal on the basis of an alleged substantial procedural violation by the opposition division became moot. Accordingly, the board did not need to decide on this issue.

57. Nevertheless, the board would like to remark that the opposition division's approach, i.e. offering the appellant one final chance to submit or discuss a claim request (see point 46 of the minutes of the oral proceedings before the opposition division), does not amount to a procedural violation within the meaning of Article 113(1) EPC *per se*, especially in view of the total absence of substantiation during the written opposition proceedings (see point 47. above).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairwoman:

I. Aperribay M. Pregetter

Decision electronically authenticated