CLAIMS

1. Use of the fusion protein of SEQ ID NO: 1 (Lip-S1D1-S2D1), the fusion protein of SEQ ID NO: 2 (Lip-S4D1-S3hybD1) and the fusion protein of SEQ ID NO: 3 (Lip-S5D1-S6D1) in the preparation of a composition as a vaccine against Lyme disease, wherein the composition is to be administered

- to a human adult at least 18 years old, or human child less than 18 years old, at least three times or at least two times at a total protein content of said 3 fusion proteins in the range of from 120 to 200 µg per dose; or
- to a human child less than 18 years old at least three times or at least two times at a total protein content of said 3 fusion proteins in the range of from 60 to 100 µg per dose,

wherein the composition comprises the fusion proteins in a weight ratio of 1:1:1 (Lip-S1D1-S2D1 : Lip-S4D1-S3hybD1 : Lip-S5D1-S6D1).

2. Use of the fusion protein of SEQ ID NO: 1 (Lip-S1D1-S2D1), the fusion protein of SEQ ID NO: 2 (Lip-S4D1-S3hybD1) and the fusion protein of SEQ ID NO: 3 (Lip-S5D1-S6D1) in the preparation of a composition for eliciting an immune response in a human against Lyme disease-causing *Borrelia*, wherein the composition is to be administered

- to a human adult at least 18 years old, or human child less than 18 years old, at least three times or at least two times at a total protein content of said 3 fusion proteins is in the range of from 120 to 200 µg per dose; or
- to a human child less than 18 years old at least three times or at least two times at a total protein content of said 3 fusion proteins in the range of from 60 to 100 µg per dose,

wherein the composition comprises the fusion proteins in a weight ratio of 1:1:1 (Lip-S1D1-S2D1 : Lip-S4D1-S3hybD1 : Lip-S5D1-S6D1).

3. The use according to claim 1 or 2, wherein:

the total protein content of said 3 fusion proteins is in the range of from 135 µg to 180 µg per dose for a human adult or child; or

the total protein content of said 3 fusion proteins is in the range of from 67.5 µg to 90 µg per dose for a young human child less than 5 years old.

4. The use according to any of claims 1 to 3, wherein the 3 fusion proteins comprise at least 60% of all proteins in the composition.

5. The use according to any of claims 1 to 4, wherein the composition comprises an adjuvant.

6. The use according to any of claims 1 to 5, wherein the composition comprises an aluminum adjuvant.

7. The use according to any of claims 1 to 6, wherein further administrations are every year after the last primary immunization or at the beginning of each tick season.

8. The use according to any of claims 1 to 7, wherein the immune response elicited comprises an anti-OspA serotype 1, an anti-OspA serotype 2, an anti-OspA serotype 3, an anti-OspA serotype 4, anti-OspA serotype 5, and/or an anti-OspA serotype 6 antibody response with bactericidal activity.

9. The use according to any of claims 1 to 8, wherein the immune response elicited comprises antibodies against OspA serotypes 1, 2, 3, 4, 5 and 6.

10. The use according to claim 8 or 9, wherein the immune response against OspA serotypes 1, 2, 3, 4, 5 and 6 is sustained for at least 60 days.

11. The use according to any of claims 1 to 10, wherein the composition comprises:

less than 1.25 ppb copper; and/or

L-methionine in a concentration of at least 10 mmol/l and/or at a concentration at least equivalent with the concentration of copper in the composition.

12. The use according to any of claims 1 to 11, wherein the composition further comprises a reactive compound, wherein the reactive compound is selected from the group consisting of a redox active compound, a radical building compound, a stabilizing compound and a combination of any thereof.

13. The use according to any of claims 1 to 12, wherein said human adult is 18-65 years old.

14. The use according to any of claims 1 to 12, wherein said human adult is an elderly subject who is 50 years or older.

15. The use according to any of claims 1 to 12, wherein said human child is a subject who is 5-17 years old.

16. The use according to any of claims 1 to 12, wherein said human child is a subject who is 0-4 years old.

17. The use according to any of claims 1 to 16, wherein said composition is to be administered to a human adult or child in a volume of 0.25 milliliter (ml) to 1.0 ml.

18. The use according to any of claims 1 to 17, wherein said composition is to be administered to a human adult or child in a volume of 0.25 ml, 0.5 ml, or 1.0 ml.

19. The use according to any one of claims 1 to 18, wherein the composition is to be administered at least two times, wherein the second administration is in the period of:

at least 5 months to at most 7 months after the first administration; or

at least 170 days to at most 190 days after the first administration.

20. The use according to claim 19, wherein the composition is to be administered at least three times, wherein a third administration is in the period of at least 15 months to at most 21 months after the first administration.

21. The use according to any one of claims 1 to 18, wherein the composition is to be administered at least three times, wherein the second administration is in the period of at least 6 weeks to at most 3 months after the first administration, and the third administration is in the period of at least 5 months to at most 7 months after the first administration.

22. The use according to any one of claims 1 to 18, wherein the composition is to be administered at least four times, wherein a fourth administration is in the period of at least 15 months to at most 21 months after the first administration.

23. The use according to any one of claims 1 to 18, wherein the composition is to be administered at least three times, wherein:

the total protein content of said 3 fusion proteins is 135 µg or 180 µg per dose for the human adult or child, wherein the second administration is 56 days after the first administration, wherein the third administration is 180 days after the first administration; or

the total protein content of said 3 fusion proteins is 67.5 µg or 90 µg per dose for a young human child less than 5 years old, wherein the second administration is 56 days after the first administration, wherein the third administration is 180 days after the first administration.

24. The use according to claim 23, wherein a further administration occurs 18 months after the first administration and every 12 months thereafter.

25. The use according to any one of claims 1 to 18, wherein the composition is to be administered at least three times, wherein:

the total protein content of said 3 fusion proteins is 135 µg or 180 µg per dose for the human adult or child, wherein the second administration is 2 months after the first administration, wherein the third administration is 6 months after the first administration; or

the total protein content of said 3 fusion proteins is 67.5 µg or 90 µg per dose for the young human child less than 5 years old, wherein the second administration is 2 months after the first administration, wherein the third administration is 6 months after the first administration.

26. The use according to claim 25, wherein a further administration occurs 18 months after the first administration and every 12 months thereafter.

27. The use according to any one of claims 1 to 18, wherein the composition is to be administered at least two times, wherein:

the total protein content of said 3 fusion proteins is 135 µg or 180 µg per dose for a human adult or child, wherein the second administration is 6 months after the first administration; or

the total protein content of said 3 fusion proteins is 67.5 µg or 90 µg per dose for a young human child less than 5 years old, wherein the second administration is 6 months after the first administration.

28. The use according to claim 27, wherein a further administration occurs 18 months after the first administration and every 12 months thereafter.