Aβ deposits to eventually solubilize or inhibit the growth of the pre-plaques. The Aβ oligomers are today considered as the most toxic Aβ species, which impairs most cognitive functions in DS people (Teller et al., 1996).

[0006] There is therefore a need for a prevention therapy which aims at preventing or slowing down the development of clinical symptoms associated with amyloid-related pathology in subjects with Down's syndrome (DS), such as, particularly, memory and/or cognitive impairments or abnormalities.

[0007] In particular, there is a need for a treatment of clinical symptoms associated with amyloid-related pathology in subjects with Down's syndrome (DS), which leads to an improvement in learning capabilities in subjects with Down's syndrome (DS) and/or improvement or restoration of memory and/or cognitive capacities.

Summary

[0007a] In one aspect, there is provided use of an antigenic peptide fragment derived from amyloid protein or amyloid-like protein selected from the group consisting of prion protein, tau protein, alpha-synuclein, huntingtin and amyloid-β or a combination thereof, in the manufacture of a medicament of the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome, wherein the antigenic peptide is modified by lipophilic or hydrophobic moiety and reconstituted in a liposome and said subjects with Down's syndrome have not yet developed amyloid protein-associated plaques in the brain.~~an antigenic peptide fragment derived from amyloid protein or amyloid-like protein for use in the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome.~~

[0007b] In another aspect, there is provided use of a composition comprising the antigenic peptide as defined herein in a therapeutically effective amount together with a pharmaceutically acceptable carrier and/or excipient in the preparation of a medicament for the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome, wherein said subjects with Down's syndrome have not yet developed amyloid protein-associated plaques in the brain. ~~a composition comprising the antigenic peptide as described herein in a therapeutically effective amount together with a pharmaceutically acceptable carrier and/or excipient for use in the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome.~~

[0007c] ~~In yet another aspect, there is provided~~Also disclosed is use of an antigenic peptide or a composition as described herein in the manufacture of a medicament for treating and/or alleviating and/or preventing memory and/or cognitive impairments or abnormalities in a subject with Down's syndrome, wherein said medicament is to be administered to said subject.

[0007d] In yet another aspect, there is provided use of the antigenic peptide, as defined herein or the composition as defined herein in the preparation of a medicament for the prevention of the development of Aβ-associated plaques in the brain.

[0007~~ed~~] ~~In yet another aspect, there is provided~~Also disclosed is the use of an antigenic peptide or a composition as described herein in the manufacture of a medicament for increasing retention of or completely restoring cognitive capacity in a subject with Down's syndrome, wherein said medicament is to be administered to said subject.

[0007~~fe~~] ~~In yet another aspect, there is provided~~Also disclosed is the use of an antigenic peptide or a composition as described herein in the manufacture of a medicament for preventing memory impairments or abnormalities in a subject with Down's syndrome, wherein the medicament is to be administered into said subject.

[0007fg] ~~In yet another aspect, there is provided~~Also disclosed is the use of an antigenic peptide or a composition as described herein in the manufacture of a medicament for reducing plaques in the brain in a subject with Down's syndrome, wherein said medicament is to be administered to said subject.

[0007h] In yet another aspect, there is provided use of the antigenic peptide as defined herein or the composition as defined herein in the preparation of a medicament for prevention of neurodegeneration.

[0007ig] In yet another aspect, there is provided use of the antigenic peptide as defined herein or the composition as defined herein in the preparation of a medicament for inducing an immune response against amyloid protein or amyloid-like protein in a subject with Down's syndrome. ~~use of an antigenic peptide or a composition as described herein in the manufacture of a medicament for inducing an immune response against amyloid protein or amyloid-like protein in a subject with Down's syndrome.~~

[0007jh] In yet another aspect, there is provided a method for producing a vaccine comprising formulating the antigenic peptide as defined herein or the composition as defined herein with a pharmacologically acceptable carrier and/or excipient and/or an adjuvant. ~~an *in vitro* method for producing a vaccine comprising formulating the antigenic peptide or composition as described herein with a pharmacologically acceptable carrier or excipient and/or an adjuvant.~~

[0007ki] In yet another aspect, there is provided an antibody or an antibody mixture obtainable from an animal immunized with the antigenic peptide as defined herein or the composition as defined herein, or the vaccine obtained by the method as described herein.~~an antibody or an antibody mixture obtainable from an animal immunized with the vaccine obtained by the method of the present disclosure.~~

[0007lj] ~~In yet another aspect, there is provided~~Also disclosed is an antibody or an antibody mixture obtainable from an animal immunized with the antigenic peptide according to the present disclosure.

[0007mk] ~~In yet another aspect, there is provided~~Also disclosed is an antibody produced by immunization of a subject with the antigenic peptide of the present disclosure.

[0007nl] ~~In yet another aspect, there is provided~~Also disclosed is an antibody produced by immunization of a subject with the composition of the present disclosure.

Detailed Description

[0008] Within the scope of the present invention the measures and means are provided which help to meet this need. In particular, the present invention provides antigenic peptides for use in prevention therapy and in the treatment of AD-like cognitive impairments in children and in young to middle-aged subjects with Down's syndrome.

[0009] In a first embodiment, the present invention provides an antigenic peptide fragment derived from amyloid protein or amyloid-like protein, particularly an antigenic peptide fragment derived from amyloid-beta protein, or a composition comprising said antigenic peptide, for use in the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities, particularly of AD-like memory and/or cognitive impairments or abnormalities, particularly impairments and abnormalities originating in the hippocampus and/or the prefrontal cortex and/or the entorhinal cortex of the brain, in young to middle-aged subjects with Down's syndrome, in particular in young subjects with Down's syndrome, who have not yet developed amyloid protein- or amyloid-like protein-associated plaques, particularly Aβ-associated plaques, in the brain.

[0010] In one embodiment, the present invention provides an antigenic peptide fragment derived from amyloid protein or amyloid-like protein, particularly an antigenic peptide fragment derived from amyloid beta protein, or a composition

CLAIMS

1. An antigenic peptide fragment derived from amyloid protein or amyloid-like protein for use in the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome.

2. The antigenic peptide fragment of claim 1 for use in the prevention memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome.

3. The antigenic peptide fragment of claims 1 and 2 wherein said memory and/or cognitive impairments originate in the hippocampus and/or the prefrontal cortex and/or the entorhinal cortex of the brain.

4. The antigenic peptide fragment of claims 1 to 3 wherein said memory and/or cognitive impairments are impairments of recognition memory and/or impairments of the contextual associative memory and/or impairments of the associative learning and/or impairments of the declarative memory for facts and events and/or episodic memory impairments and/or language dysfunction such as aphasia and/or visuospatial impairments, such as misplacement of items and difficulty navigating in unfamiliar and familiar terrain and/or decreased executive functions, such as apathy, disinhibition, social isolation, poor judgment, difficulties with planning and/or poor abstract reasoning and/or personality changes and/or emotional changes such as apathy, agitation and psychosis and/or apraxia and/or impairments of performing learned motor tasks and/or other neurological signs including pyramidal and extrapyramidal findings as well as myoclonus or seizures.

5. The antigenic peptide fragment of claims 1 to 4, wherein said amyloid protein or amyloid-like protein is an antigenic peptide fragment derived from amyloid-beta protein.

6. The antigenic peptide fragment of any of the preceding claims, wherein said subjects with Down's syndrome have not yet developed amyloid protein- or amyloid-like protein-associated, plaques in the brain.

7. The antigenic peptide of any of the preceding claims, wherein said subject has developed Aβ-associated plaques in the brain.

8. The antigenic peptide of any of the preceding claims, wherein said plaques are Aβ-associated plaques.

9. The antigenic peptide fragment of any of the preceding claims, wherein said memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome are AD-like memory and/or cognitive impairments or abnormalities.

10. The antigenic peptide of any of the preceding claims, wherein said subject with Down's syndrome is a young to middle-aged subject.

11. The antigenic peptide of any of the preceding claims, wherein said subject with Down's syndrome is a middle-aged subject.

12. The antigenic peptide of any of the preceding claims, wherein said subject with Down's syndrome is a young-aged subject.

13. The antigenic peptide of any of the preceding claims, wherein said subject with Down's syndrome is a children-aged subject.

14. The antigenic peptide of any of the preceding claims, wherein said subject is below age 65, particularly below 60, particularly below 55, particularly below 50, particularly below 45, particularly below 40, particularly below 35, particularly below 30, particularly below 25, particularly below 20, particularly below 15, particularly below 10 particularly below 5, particularly below 3.

15. The antigenic peptide of any one of the preceding claims, wherein said treatment leads to

    a. an amelioration and/or restoration of memory; and/or

b. an increase in the retention or a complete restoration of cognitive capacity in the treated subject.

16. The antigenic peptide of any one of the preceding claims, wherein said treatment does not induce unwanted side effects such as meningoencephalitis and microhemorrhage.

17. The antigenic peptide of any of the preceding claims for use in the prevention of the development of Aβ-associated plaques in the brain.

18. The antigenic peptide of any of the preceding claims for use in the reduction of the amount of Aβ-associated plaques in the brain.

19. The antigenic peptide of claim 16 or 17, for use in the reduction of the amount of Aβ-associated plaques in the hippocampus and/or the prefrontal cortex and/or the entorhinal cortex.

20. The antigenic peptide of any one of the preceding claims, wherein said amyloid protein or amyloid-like protein is selected from the group consisting of prion protein, tau protein, alpha-synuclein, huntingtin and amyloid beta.

21. The antigenic peptide of any one of the preceding claims, wherein said Aβ antigenic peptide fragment corresponds to the N-terminal part of the Aβ peptide, particularly the N-terminal Aβ1-15 fragment.

22. The antigenic peptide of any one of the preceding claims, wherein said Aβ antigenic peptide fragment corresponds to the central part of the Aβ peptide, particularly the Aβ14-29 fragment.

23. The antigenic peptide of any one of the preceding claims, wherein said Aβ antigenic peptide fragment corresponds to the C-terminal part of the Aβ peptide, particularly the C-terminal Aβ22-35 fragment.

24. The antigenic peptide of any one of the preceding claims, wherein the Aβ peptide antigen is presented reconstituted in a liposome.

25. The antigenic peptide of any one of the preceding claims, wherein the Aβ peptide antigen is modified by a lipophilic or hydrophobic moiety that facilitates insertion into the lipid bilayer of the liposome carrier/adjuvant.

26. The antigenic peptide of any one of the preceding claims, wherein the Aβ peptide antigen is modified by a palmitic acid bound to the N- and/or C-terminus of the peptide molecule.

27. The antigenic peptide of any of the preceding claims, wherein the Aβ peptide antigen is modified by four palmitic acids bound to the N- and/or C-terminus of the peptide molecule.

28. The antigenic peptide of any of the preceding claims, wherein the Aβ peptide antigen is modified by two palmitic acids bound to the N- and/or C-terminus of the peptide molecule.

29. The antigenic peptide of any one of the preceding claims, wherein the antigenic peptide is presented in a repetitive array on the surface of the liposome.

30. The antigenic peptide of any of the preceding claims, wherein said highly repetitive array on the surface of the carrier or liposome comprises at least 10 repetitive antigenic units/carrier molecule.

31. The antigenic peptide of any of the preceding claims, wherein at least 75%, particularly at least 80%, particularly at least 90%, but especially 100% of the reconstituted antigenic peptide is present on the surface of the liposome, inserted into the lipid bilayer through its hydrophobic moieties.

32. A composition comprising the antigenic peptide of any of the preceding claims in a therapeutically effective amount together with a pharmaceutically acceptable carrier and/or excipient for use in the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome.

33. The composition of any of the preceding claims comprising an adjuvant.

34. The antigenic peptide of any of the preceding claims for use in enhancing or restoring said impairment or abnormality in subjects with Down's syndrome.

35. The antigenic peptide of any of the preceding claims, wherein said antigenic peptide is derived from the N-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues Aβ1-15, Aβ1-16, Aβ1-17, Aβ1-18, Aβ1-19, Aβ1-20, Aβ1-22, or Aβ1-23.

36. The antigenic peptide of any of the preceding claims, wherein said antigenic peptide is derived from the N-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues.

37. The antigenic peptide of any of the preceding claims, wherein said antigenic peptide consists of residues Aβ1-15.

38. The antigenic peptide of any of the preceding claims, wherein said antigenic peptide is derived from the C-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues Aβ20-36, Aβ20-40, Aβ20-42, Aβ21-36, Aβ21-40, Aβ21-42, Aβ22-36, Aβ22-40 or Aβ22-42.

39. The antigenic peptide of any of the preceding claims, wherein said antigenic peptide consists of residues Aβ22-35.

40. Use of an antigenic peptide or a composition according to any of the preceding claims in the manufacture of a medicament for treating and/or alleviating and/or preventing memory and/or cognitive impairments or abnormalities in a subject with Down's syndrome, wherein said medicament is to be administered to said subject.

41. The use of claim 40, wherein said impairment or abnormality originates in the hippocampus and/or the prefrontal cortex and/or the entorhinal cortex of the brain.

42. The use of claims 40 and 41, wherein said impairment or abnormality concerns recognition memory and/or impairments of the contextual associative memory and/or impairments of the associative learning and/or impairments of the declarative memory for facts and events and/or episodic memory impairments and/or language dysfunction such as aphasia and/or visuospatial impairments, such as misplacement of items

and difficulty navigating in unfamiliar and familiar terrain and/or decreased executive functions, such as apathy, disinhibition, social isolation, poor judgment, difficulties with planning and/or poor abstract reasoning and/or personality changes and/or emotional changes such as apathy, agitation and psychosis and/or apraxia and/or impairments of performing learned motor tasks and/or other neurological signs including pyramidal and extrapyramidal findings as well as myoclonus or seizures.

43. The use of any of claims 40 to 42, wherein said antigenic peptide for use in enhancing or restoring recognition memory in subjects with Down's syndrome is derived from the N-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues Aβ1-15, Aβ1-16, Aβ1-17, Aβ1-18, Aβ1-19, Aβ1-20, Aβ1-22, or Aβ1-23.

44. The use of any of claims 40 to 43, wherein said antigenic peptide for use in enhancing or restoring recognition memory in subjects with Down's syndrome is derived from the N-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues.

45. The use of any of claims 40 to 44, wherein said antigenic peptide consists of amino acid residues Aβ1-15.

46. The use of any of claims 40 to 45, wherein said antigenic peptide for use in enhancing or restoring contextual associative memory in subjects with Down's syndrome is derived from the N-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues Aβ1-15, Aβ1-16, Aβ1-17, Aβ1-18, Aβ1-19, Aβ1-20, Aβ1-22, or Aβ1-23.

47. The use of any of claims 40 to 46, wherein said antigenic peptide for use in enhancing or restoring associative learning in subjects with Down's syndrome is derived from the N-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues Aβ1-15, Aβ1-16, Aβ1-17, Aβ1-18, Aβ1-19, Aβ1-20, Aβ1-22, or Aβ1-23.

48. The use of any of claims 40 to 47, wherein said antigenic peptide for use in enhancing or restoring associative learning in subjects with Down's syndrome is derived from the C-terminal part of the Aβ peptide, particularly said antigenic peptide consists of all or part of amino acid residues Aβ20-36, Aβ20-40, Aβ20-42, Aβ21-36, Aβ21-40, Aβ21-42, Aβ22-36, Aβ22-40 or Aβ22-42.

49. The use of any of claims 40 to 48, wherein said antigenic peptide consists of amino acid residues Aβ22-35.

50. Use of an antigenic peptide or a composition according to any of the preceding claims in the manufacture of a medicament for increasing retention of or completely restoring cognitive capacity in a subject with Down's syndrome, wherein said medicament is to be administered to said subject.

51. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject has not yet developed Aβ-associated plaques in the brain.

52. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject has developed Aβ-associated plaques in the brain.

53. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject with Down's syndrome is a young to middle-aged subject.

54. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject with Down's syndrome is a middle-aged subject.

55. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject with Down's syndrome is a young-aged subject.

56. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject with Down's syndrome is a children-aged subject.

57. The antigenic peptide, composition or use according to any one of the preceding claims, wherein said subject is below age 65, particularly below 60, particularly below 55, particularly below 50, particularly below 45, particularly below 40, particularly below 35, particularly below 30, particularly below 25,

particularly below 20, particularly below 15, particularly below 10 particularly below 5, particularly below 3.

58. Use of an antigenic peptide or a composition according to claims 1-39 in the manufacture of a medicament for preventing memory and/or cognitive impairments or abnormalities in a subject with Down's syndrome, wherein the medicament is to be administered to said subject.

59. Use of an antigenic peptide or a composition according to claims 1-39 in the manufacture of a medicament for preventing memory impairments or abnormalities in a subject with Down's syndrome, wherein the medicament is to be administered into said subject.

60. Use of an antigenic peptide or a composition according to any of the preceding claims in the manufacture of a medicament for reducing plaques in the brain in a subject with Down's syndrome, wherein said medicament is to be administered to said subject.

61. The use of claim 60 wherein the antigenic peptide or a composition according to any of the preceding claims reduces plaques in the hippocampus and/or the prefrontal cortex and/or the entorhinal cortex of the brain.

62. The use of claims 60 and 61 wherein said reduction of plaques leads to the alleviation and/or prevention of impairment or abnormality concerning the recognition memory and/or impairments of the contextual associative memory and/or impairments of the associative learning and/or impairments of the declarative memory for facts and events and/or episodic memory impairments and/or language dysfunction such as aphasia and/or visuospatial impairments, such as misplacement of items and difficulty navigating in unfamiliar and familiar terrain and/or decreased executive functions, such as apathy, disinhibition, social isolation, poor judgment, difficulties with planning and/or poor abstract reasoning and/or personality changes and/or emotional changes such as apathy, agitation and psychosis and/or apraxia and/or impairments of performing learned motor tasks and/or other neurological signs including pyramidal and extrapyramidal findings as well as myoclonus or seizures.

63. The antigenic peptide, the composition and/or the use of any of the preceding claims, wherein said antigenic peptide, composition and/or use is for prevention of neurodegeneration.

64. Use of an antigenic peptide or a composition according to claims 1 to 39 in the manufacture of a medicament for for inducing an immune response against amyloid protein or amyloid-like protein in a subject with Down's syndrome.

65. An *in vitro* method for producing a vaccine comprising formulating the antigenic peptide or composition of any of the preceding claims with a pharmacologically acceptable carrier or excipient and/or an adjuvant. .

66. An antibody **or an antibody mixture** obtainable from an animal immunized with the vaccine obtained by the method of claim 65.

67. An antibody **or an antibody mixture** obtainable from an animal immunized with the antigenic peptide according to any one of the preceding claims.

68. An antibody produced by immunization of a subject with the antigenic peptide of any of the preceding claims.

69. An antibody produced by immunization of a subject with the composition of any of the preceding claims.

CLAIMS

1. Use of an antigenic peptide fragment derived from amyloid protein or amyloid-like protein selected from the group consisting of prion protein, tau protein, alpha-synuclein, huntingtin and amyloid-β or a combination thereof, in the manufacture of a medicament of the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome, wherein the antigenic peptide is modified by lipophilic or hydrophobic moiety and reconstituted in a liposome and said subjects with Down's syndrome have not yet developed amyloid protein-associated plaques in the brain.

2. The use of claim1, wherein said memory and/or cognitive impairments originate in the hippocampus and/or the prefrontal cortex and/or the entorhinal cortex of the brain.

3. The use of any one of claim 1 or claim 2, wherein said memory and/or cognitive impairments are impairments of recognition memory and/or impairments of the contextual associative memory and/or impairments of the associative learning and/or impairments of the declarative memory for facts and events and/or episodic memory impairments and/or language dysfunction such as aphasia and/or visuospatial impairments, such as misplacement of items and difficulty navigating in unfamiliar and familiar terrain and/or decreased executive functions, such as apathy, disinhibition, social isolation, poor judgment, difficulties with planning and/or poor abstract reasoning and/or personality changes and/or emotional changes such as apathy, agitation and psychosis and/or apraxia and/or impairments of performing learned motor tasks and/or other neurological signs including pyramidal and extrapyramidal findings as well as myoclonus or seizures.

4. The use of any one of claims 1 to 3, wherein said amyloid protein or amyloid-like protein is an antigenic peptide fragment derived from amyloid-beta protein.

5. The use of any one of claims 1 to 4, wherein said memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome are AD-like memory and/or cognitive impairments or abnormalities.

6. The use of any one of claims 1 to 5, wherein said subject with Down's syndrome is

   a) a young to middle-aged subject; or
   b) a middle-aged subject; or
   c) a young-aged subject; or
   d) a children-aged subject.

7. The use of any one of claims 1 to 6, wherein said subject is below age 65, particularly below 60, particularly below 55, particularly below 50, particularly below 45, particularly below 40, particularly below 35, particularly below 30, particularly below 25, particularly below 20, particularly below 15, particularly below 10 particularly below 5, particularly below 3.

8. The use of any one of claims1 to 7, wherein said treatment leads to

   a. an amelioration and/or restoration of memory; and/or
   b. an increase in the retention or a complete restoration of cognitive capacity in the treated subject; and/or
   c. enhancing or restoring memory and/or cognitive capacity.

9. The use of any of the claims 1 to 7, wherein said treatment leads to

   a. enhancing or restoring recognition memory; and/or
   b. enhancing or restoring contextual associative memory; and/or
   c. enhancing or restoring associative learning.

10. The use of any one of claims 1 to 9, wherein said treatment does not induce unwanted side effects such as meningoencephalitis and microhemorrhage.

11. The use of any one of claims 1 to 10, wherein said Aβ antigenic peptide fragment corresponds to

a. the N-terminal part of the Aβ protein, particularly the N-terminal Aβ1-15 fragment; or
b. the central part of the Aβ protein, particularly the Aβ14-29 fragment; or
c. the C-terminal part of the Aβ protein, particularly the C-terminal Aβ22-35 fragment.

12. The antigenic peptide of claims 1 to 11,wherein the Aβ peptide antigen is modified by a palmitic acid bound to the N- and/or C-terminus of the peptide.

13. The use of claim 12, wherein the Aβ peptide antigen is modified by

a. four palmitic acids bound to the N- and/or C-terminus of the peptide; or
b. two palmitic acids bound to the N- and/or C-terminus of the peptide.

14. The use of any one of claims 1 to 13, whereinsaid antigenic peptide is derived from the N-terminal part of the Aβ protein, selected from the group consisting of Aβ1-15, Aβ1-16, Aβ1-17, Aβ1-18, Aβ1-19, Aβ1-20, Aβ1-22, or Aβ1-23, particularly of residues Aβ1-15.

15. The use of any one of claims 1 to 13, wherein said antigenic peptide is derived from the C-terminal part of the Aβ protein, selected from the group consisting of Aβ20-36, Aβ20-40, Aβ20-42, Aβ21-36, Aβ21-40, Aβ21-42, Aβ22-36, Aβ22-40 or Aβ22-42, particularly of residues Aβ22-35.

16. Use of a composition comprising the antigenic peptide as defined in any one of claims 1 to 15 in a therapeutically effective amount together with a pharmaceutically acceptable carrier and/or excipient in the preparation of a medicament for the treatment and/or alleviation and/or prevention of memory and/or cognitive impairments or abnormalities in subjects with Down's syndrome, wherein said subjects with Down's syndrome have not yet developed amyloid protein-associated plaques in the brain.

17. The use of claim 16 comprising an adjuvant.

18. The use of claim 16 or claim 17 for the treatment and/or alleviation and/or prevention of a disease or impairment as defined in any one of claims 2 to 10.

19. Use of the antigenic peptide, as defined in any one of claims 1 to 15 or the composition as defined in any one of claims 16 to 18 in the preparation of a medicament for the prevention of the development of Aβ-associated plaques in the brain.

20. Use of the antigenic peptide as defined in any one of claims 1 to 15 or the composition as defined in any one of claims 16 to 18 in the preparation of a medicament for prevention of neurodegeneration.

21. Use of the antigenic peptide as defined in any one of claims 1 to 15 or the composition as defined in any one of claims 16 to 18 in the preparation of a medicament for inducing an immune response against amyloid protein or amyloid-like protein in a subject with Down's syndrome.

22. A method for producing a vaccine comprising formulating the antigenic peptide as defined in any one of claims 1 to 15 or the composition as defined in any one of claims 16 to 18 with a pharmacologically acceptable carrier and/or excipient and/or an adjuvant.

23. An antibody **or an antibody mixture** obtainable from an animal immunized with the antigenic peptide as defined in any one of claims 1 to 15 or the composition as defined in any one of claims 16 to 18, or the vaccine obtained by the method of claim 22.