WHAT IS CLAIMED IS:

1. An isolated antibody that specifically interacts and shows a measurable affinity to a conformational epitope of a protofibril form of Aβ peptide, whereby the protofibril epitope is represented by an exposed region of a Aβ-protofibril form comprising the amino acid sequence as set forth in SEQ ID NO:2, wherein said antibody shows minimal or no affinity for monomer or dimer forms of Aβ peptide.

2. The antibody of claim 1 which is a monoclonal antibody.

3. The monoclonal antibody of claim 2 which is a humanized monoclonal antibody.

4. The monoclonal antibody of claim 2 which is a human monoclonal antibody.

5. An isolated antibody that specifically interacts and shows a measurable affinity to a conformational epitope of a protofibril form of Aβ peptide, whereby the protofibril epitope is represented by an exposed region of a Aβ-protofibril form comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3 and SEQ ID NO:4, wherein said antibody shows minimal or no affinity for monomer or dimer forms of Aβ peptide.

6. The antibody of claim 5 which is a monoclonal antibody.

7. The monoclonal antibody of claim 6 which is designated 13C3.

8. The monoclonal antibody of claim 6 which is a humanized monoclonal antibody

9. The monoclonal antibody of claim 6 which is a human monoclonal antibody.

10. The antibody of claim 5 further comprising a variable light chain comprised of the amino acid sequence as set forth in SEQ ID NO:5.

11. The antibody of claim 5 further comprising a variable heavy chain comprised of the amino acid sequence as set forth in SEQ ID NO:7.

12 The antibody of claim 5 further comprising a variable light chain comprising a CDR1 region as set forth in SEQ ID NO:13, a CDR2 region as set forth in SEQ ID NO:14, and a CDR3 as set forth in SEQ ID NO:15.

13 The antibody of claim 5 further comprising a variable heavy chain comprised of a CDR1 region as set forth in SEQ ID NO:20, a CDR2 region as set forth in SEQ ID NO:21, and a CDR3 as set forth in SEQ ID NO:22.

14. A method of producing a monoclonal antibody which specifically binds *in vitro* to a repeating conformational epitope of a protofibril form of β-amyloid peptide while showing minimal affinity to low molecular weight forms of β-amyloid peptide, comprising:

(a) immunizing a mammal with the protofibril form of β-amyloid peptide;

(b) harvesting B-cells of said mammal;

(c) creating hybridomas from the harvested B-cells, wherein said hybridomas produce antibodies; and,

(d) selecting hybridomas which produce antibodies specifically binding to the protofibril form of β-amyloid

peptide while showing minimal affinity to monomer or dimer forms of β-amyloid peptide.

15. A method for quantifying the amount of a protofibril form of β-amyloid peptide in a tissue or fluid sample, comprising:

(a) obtaining the tissue or fluid sample from a subject;

(b) contacting the tissue or fluid sample with an antibody or fragment thereof that specifically binds to the protofibril form of β-amyloid peptide while showing minimal affinity to low molecular weight forms of β-amyloid peptide; and,

(c) quantifying the amount of protofibril form of β-amyloid peptide in the sample.

16. The method of claim 15 wherein the antibody is monoclonal antibody selected from the group consisting of 13C3, 1D1 and 19A6.

17. A kit for detecting protofibril form of β-amyloid peptide while showing minimal affinity to low molecular weight forms of β-amyloid peptide, comprising:

(a) an antibody or a fragment thereof, capable of specifically binding *in vitro* to a repeating conformational epitope of a protofibril form of β-amyloid peptide while showing minimal affinity to low molecular weight forms of β-amyloid peptide; and,

(b) a reagent that binds, directly, or indirectly, to said antibody or the fragment thereof.

18. The kit of claim 17 wherein the antibody is monoclonal antibody selected from the group consisting of 13C3, 1D1 and 19A6.

19. A method of treating or preventing deposition of β-amyloid fiber plaques within a mammal which comprises administering to the mammal pharmaceutically effective amount of, at the minimum, variable region fragment which specifically interacts with the protofibril form of β-amyloid peptide so as to inhibit formation and deposition of β-amyloid fiber plaques.

20. The method of claim 19 wherein the antibody is a monoclonal antibody.

21. The method of claim 20 wherein the monoclonal antibody is an antibody selected from the group consisting of 13C3, 19A6 and 1D1.

22. The method of claim 20 wherein the monoclonal antibody is a humanized monoclonal antibody.

23. The method of claim 20 wherein the monoclonal antibody is a human monoclonal antibody.

24. A hybridoma which secretes an antibody selected from the group consisting of 13C3, 19A6 and 1D1.

25. An isolated nucleic acid molecule encoding a variable heavy chain fragment of monoclonal antibody 13C3 wherein the variable heavy chain fragment comprises the amino acid sequence as set forth in SEQ ID NO:7.

26. An isolated nucleic acid molecule encoding a variable heavy chain fragment of monoclonal antibody 13C3 wherein the nucleic acid molecule comprises the nucleotide sequence as set for in SEQ ID NO:8.

27. An expression vector for the expression of a variable heavy chain fragment of monoclonal antibody 13C3 in a recombinant host cell wherein said expression vector contains the nucleic acid molecule of claim 26.

28. A host cell which expresses a variable heavy chain fragment of monoclonal antibody 13C3 wherein said host cell contains the expression vector of claim 27.

29. An isolated nucleic acid molecule encoding a variable light chain fragment of monoclonal antibody 13C3 wherein the variable light chain fragment comprises the amino acid sequence as set forth in SEQ ID NO:5.

30. An isolated nucleic acid molecule encoding a variable light chain fragment of monoclonal antibody 13C3 wherein the nucleic acid molecule comprises the nucleotide sequence as set for in SEQ ID NO:6.

31. An expression vector for the expression of a variable light chain fragment of monoclonal antibody 13C3 in a recombinant host cell wherein said expression vector contains the nucleic acid molecule of claim 30.

32. A host cell which expresses a variable light chain fragment of monoclonal antibody 13C3 wherein said host cell contains the expression vector of claim 31.

33. An isolated variable heavy chain fragment of monoclonal antibody 13C3 which comprises the amino acid sequence set forth in SEQ ID NO:7.

34. An isolated variable light chain fragment of monoclonal antibody 13C3 which comprises the amino acid sequence set forth in SEQ ID NO:5.

WHAT IS CLAIMED IS:

1. An isolated antibody that specifically interacts and shows a measurable affinity to a conformational epitope of a protofibril form of Aβ peptide, whereby the protofibril epitope is represented by an exposed region of a Aβ-protofibril form comprising the amino acid sequence as set forth in SEQ ID NO:2, wherein said antibody shows minimal or no affinity for monomer or dimer forms of Aβ peptide, and wherein said specific interaction is characterized by a ratio of the affinity for the protofibrillar Aβ form to the affinity for the low molecular weight Aβ form ("PF/LMW ratio") of greater than about 2.

2. The antibody of claim 1 which is a monoclonal antibody.

3. The antibody of claim 2 which is a humanized monoclonal antibody or a human monoclonal antibody.

4. The antibody of claim 1 or 2, further comprising a variable light chain comprising a CDR1 region as set forth in SEQ ID NO: 13, a CDR2 region as set forth in SEQ ID NO:14, and a CDR3 as set forth in SEQ ID NO:15.

5. The antibody of claim 4 which is a humanized monoclonal antibody.

6. The antibody of any one of claims 1-5, whereby the protofibril epitope is represented by an exposed region of a Aβ-protofibril form comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3 and SEQ ID NO:4, wherein said antibody shows minimal or no affinity for monomer or dimer forms of Aβ peptide.

7. The antibody of claim 6 which is a monoclonal antibody.

8. The antibody of claim 7 which is designated 13C3.

9. The antibody of claim 7 which is a humanized monoclonal antibody or a human monoclonal antibody.

10. The antibody of claim 6 or 7, further comprising a variable light chain comprised of the amino acid sequence as set forth in SEQ ID NO:5, or a variable heavy chain comprised of the amino acid sequence as set forth in SEQ ID NO:7.

11. The antibody of claim 6 or 7, further comprising a variable light chain comprising a CDR1 region as set forth in SEQ ID NO:13, a CDR2 region as set forth in SEQ ID NO:14, and a CDR3 as set forth in SEQ ID NO:15.

12. The antibody of claim 11 which is a humanized monoclonal antibody.

13. The antibody of claim 6 or 7, further comprising a variable heavy chain comprised of a CDR1 region as set forth in SEQ ID NO:20, a CDR2 region as set forth in SEQ ID NO:21, and a CDR3 as set forth in SEQ ID NO:22.

14. A method of producing an antibody of any one of claims 1-13, comprising:

(a) immunizing a mammal with the protofibril form of β-amyloid peptide;

(b) harvesting B-cells of said mammal;

(c) creating hybridomas from the harvested B-cells, wherein said hybridomas produce antibodies; and,

(d) selecting hybridomas which produce antibodies specifically binding to the protofibril form of β-amyloid peptide while showing minimal affinity to monomer or dimer forms of β-amyloid peptide.

15. An *in vitro* method for quantifying the amount of a protofibril form of β-amyloid peptide in a tissue or fluid sample, comprising:

(a) contacting a tissue or fluid sample obtained from a subject with an antibody according to any one of claims 1 to 13 or fragment thereof that specifically binds to the protofibril form of β-amyloid peptide while showing minimal affinity to low molecular weight forms of β-amyloid peptide; and,

(b) quantifying the amount of protofibril form of β-amyloid peptide in the sample.

16. The method of claim 15 wherein the antibody is monoclonal antibody selected from the group consisting of 13C3,1D1 and 19A6.

17. A kit for detecting protofibril form of β-amyloid peptide while showing minimal affinity to a low molecular weight form of β-amyloid peptide, comprising:

(a) an antibody of any of claims 1-13 or a fragment thereof, capable of specifically binding *in vitro* to a repeating conformational epitope of a protofibril form of β-amyloid peptide while showing minimal affinity to low molecular weight forms of β-amyloid peptide; and,

(b) a reagent that binds, directly, or indirectly, to said antibody or the fragment thereof.

18. The kit of claim 17 wherein the antibody is monoclonal antibody selected from the group consisting of 13C3,1D1 and 19A6.

19. A pharmaceutical composition comprising an antibody according to any one of claims 1 to 13.

20. A pharmaceutical composition comprising a variable region fragment of an antibody according to any one of claims 1 to 13 which specifically interacts with the protofibrillar form of β-amyloid, wherein said specific interaction is characterized by a ratio of the affinity of said variable region fragment for the protofibrillar Aβ form to the affinity for other Aβ forms greater than about 2.

21. The pharmaceutical composition of claim 20 wherein the antibody is a monoclonal antibody.

22. The pharmaceutical composition of claim 21 wherein the monoclonal antibody is an antibody selected from the group consisting of 13C3,19A6 and 1D1.

23. The pharmaceutical composition of claim 21 wherein the monoclonal antibody is a humanized monoclonal antibody or a human monoclonal antibody.

24. The pharmaceutical composition of claim 20 or 21, wherein the antibody further comprises a variable light chain comprising a CDR1 region as set forth in SEQ ID NO:13, a CDR2 region as set forth in SEQ ID NO:14, and a CDR3 as set forth in SEQ ID NO: 15.

25. The pharmaceutical composition of claim 23, wherein the antibody is a humanized monoclonal antibody.

26. A hybridoma which secretes an antibody selected from the group consisting of 13C3,19A6 and 1D1.

27. An isolated nucleic acid molecule encoding a variable heavy chain fragment of monoclonal antibody 13C3 wherein the variable heavy chain fragment comprises the amino acid sequence as set forth in SEQ ID NO:7.

28. An isolated nucleic acid molecule encoding a variable heavy chain fragment of monoclonal antibody 13C3 wherein the nucleic acid molecule comprises the nucleotide sequence as set forth in SEQ ID NO:8.

29. An expression vector for the expression of a variable heavy chain fragment of monoclonal antibody 13C3 in a recombinant host cell wherein said expression vector contains the nucleic acid molecule of claim 27.

30. A host cell which expresses a variable heavy chain fragment of monoclonal antibody 13C3 wherein said host cell contains the expression vector of claim 29.

31. An isolated nucleic acid molecule encoding a variable light chain fragment of monoclonal antibody 13C3 wherein the variable light chain fragment comprises the amino acid sequence as set forth in SEQ ID NO:5.

32. An isolated nucleic acid molecule encoding a variable light chain fragment of monoclonal antibody 13C3 wherein the nucleic acid molecule comprises the nucleotide sequence as set forth in SEQ ID NO:6.

33. An expression vector for the expression of a variable light chain fragment of monoclonal antibody 13C3 in a recombinant host cell wherein said expression vector contains the nucleic acid molecule of claim 32.

34. A host cell which expresses a variable light chain fragment of monoclonal antibody 13C3 wherein said host cell contains the expression vector of claim 33.

35. An isolated variable heavy chain fragment of monoclonal antibody 13C3 which comprises the amino acid sequence set forth in SEQ ID NO:7.

36. An isolated variable light chain fragment of monoclonal antibody 13C3 which comprises the amino acid sequence set forth in SEQ ID NO:5.

37. Use of a pharmaceutically effective amount of an antibody according to any one of claims 1 to 13, characterized by being for manufacturing a medicament useful for treatment and/or prevention of beta-amyloid plaque deposition associated with the onset and progression of Alzheimer's disease.

38. Use of an antibody according to any one of claims 1 to 13, characterized by being for manufacturing a medicament useful for treating Alzheimer's disease.