CLAIMS

1. An alpha-synuclein (α-Syn) peptide immunogen construct comprising:

a B cell epitope comprising 10 to 25 amino acid residues from a C-terminal fragment of α-Syn corresponding to amino acid G111 to amino acid D135 of SEQ ID NO: 1;

a T helper epitope comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 70-98; and

an optional heterologous spacer selected from the group consisting of an amino acid, Lys-, Gly-, Lys-Lys-Lys-, (α, ε-N)Lys, and ε-N-Lys-Lys-Lys-Lys (SEQ ID NO: 148),

wherein the B cell epitope is covalently linked to the T helper epitope directly or through the optional heterologous spacer.

2. The α-Syn peptide immunogen construct of **claim 1**, wherein the B cell epitope is selected from the group consisting of SEQ ID NOs: 12 – 15, 17, and 49 – 63.

3. The α-Syn peptide immunogen construct of **claim 1**, wherein the T helper epitope is selected from the group consisting of SEQ ID NOs: 81, 83, and 84.

4. The α-Syn peptide immunogen construct of **claim 1**, wherein the optional heterologous spacer is (α, ε-N)Lys or ε-N-Lys-Lys-Lys-Lys (SEQ ID NO: 148).

5. The α-Syn peptide immunogen construct of **claim 1**, wherein the T helper epitope is covalently linked to the amino terminus of the B cell epitope.

6. The α-Syn peptide immunogen construct of **claim 1**, wherein the T helper epitope is covalently linked to the amino terminus of the B cell epitope through the optional heterologous spacer.

7. The α-Syn peptide immunogen construct of **claim 1** comprising the following formula:

$(Th)_m$–$(A)_n$–(α-Syn C-terminal fragment)–X

or

(α-Syn C-terminal fragment)–$(A)_n$–$(Th)_m$–X

wherein

Th is the T helper epitope;

A is the heterologous spacer;

(α-Syn C-terminal fragment) is the B cell epitope;

X is an α-COOH or α-$CONH_2$ of an amino acid;

m is from 1 to about 4; and

n is from 1 to about 10.

8. The α-Syn peptide immunogen construct of **claim 1**, comprising the amino acid sequence selected from the group consisting of SEQ ID NOs: 107, 108, 111 – 113, and 115 – 147.

9. The α-Syn peptide immunogen construct of **claim 1**, comprising the amino acid sequence selected from the group consisting of SEQ ID NOs: 107, 108, and 111 – 113.

10. A composition comprising the α-Syn peptide immunogen construct of **claim 1**.

11. A composition comprising more than one α-Syn peptide immunogen construct of **claim 1**.

12. The composition of **claim 11**, wherein the α-Syn peptide immunogen constructs have amino acid sequences of SEQ ID NOs: 112 and 113.

13. A pharmaceutical composition comprising the α-Syn peptide immunogen construct of **claim 1** and a pharmaceutically acceptable delivery vehicle and/or adjuvant.

14. The pharmaceutical composition of **claim 13**, wherein

a. the α-Syn peptide immunogen construct is selected from the group consisting of SEQ ID NOs: 107, 108, 111 – 113, and 115 – 147; and

b. the adjuvant is a mineral salt of aluminum selected from the group consisting of $Al(OH)_3$ or $AlPO_4$.

15. The pharmaceutical composition of **claim 13**, wherein

a. the α-Syn peptide immunogen construct is selected from the group consisting of SEQ ID NOs: 107, 108, 111 – 113, and 115 – 147; and

b. the α-Syn peptide immunogen construct is mixed with an CpG oligodeoxynucleotide (ODN) to form a stabilized immunostimulatory complex.

16. An isolated antibody or epitope-binding fragment thereof that specifically binds to the B cell epitope of the α-Syn peptide immunogen construct of **claim 1**.

17. The isolated antibody or epitope-binding fragment thereof according to **claim 16** bound to the α-Syn peptide immunogen construct.

18. An isolated antibody or epitope-biding fragment thereof that specifically binds to the B cell epitope of the α-Syn peptide immunogen construct of **claim 9**.

19. A composition comprising the isolated antibody or epitope-binding fragment thereof according to **claim 16**.

20. A composition comprising the isolated antibody or epitope-binding fragment thereof according to **claim 18**.

21. The composition of **claim 20**, comprising a mixture of

a. an isolated antibody or epitope-binding fragment thereof that specifically binds to the B cell epitope of SEQ ID NO: 112; and

b. an isolated antibody or epitope-binding fragment thereof that specifically binds to the B cell epitope of SEQ ID NO: 113.

22. Use of the α-Syn peptide immunogen of **claim 1** and a delivery vehicle and/or adjuvant in the manufacture of a medicament for producing antibodies that recognize α-Syn in a host.

23. Use of the α-Syn peptide immunogen of **claim 1** in the manufacture of a medicament for inhibiting α-Syn aggregation in an animal.

24. Use of the α-Syn peptide immunogen of **claim 1** in the manufacture of a medicament for

reducing the amount of α-Syn aggregates in an animal.

25. A method of identifying α-Syn aggregates of different sizes in a biological sample comprising:

a. exposing the biological sample to the antibody or epitope-binding fragment thereof according to **claim 16** under conditions that allow the antibody or epitope-binding fragment thereof to bind to the α-Syn aggregates; and

b. detecting the amount of the antibody or epitope-binding fragment thereof bound to the α-Syn aggregates in the biological sample.