CLAIMS

1. A method of detecting and separating an infectious prion protein, PrPsc, from a sample comprising contacting the sample with the prion protein binding material under conditions allowing formation of a complex between the infectious prion protein and the prion protein binding material, wherein the prion binding material comprises a functional group, wherein the functional group is a hydrophilic, a hydrophobic, or an amphiphilic functional group selected from the group consisting of: $-OCH_2-CHOH-CH_2NH_2$, $-C_6H_5$, $-(CH_2)_3-CH_3$, $-CH_2-CH_2-N^+H(CH_3)_2$, $-CH_2-CH_2-N^+(CH_3)_3$, a dimethylaminoethyl group and a trimethylaminoethyl group.

2. The method of Claim 1, wherein the binding material comprises aluminum or silica.

3. The method of any one of Claims 1-2, wherein the binding material comprises a polymer matrix.

4. The method of Claim 3, wherein the polymer matrix is a polymethacrylate or a methacrylate.

5. The method of Claim 3, wherein the polymer matrix is a polymethacrylate resin.

6. The method of Claim 3, wherein the polymer matrix is a hydroxyl polymethacrylate resin.

7. The method of any one of Claims 1-6, wherein the functional group is $-OCH_2-CHOH-CH_2NH_2$.

8. The method of any preceding claim, wherein the binding material is in bead form.

9. The method of any one of Claims 1-8, wherein the sample is a biological sample, a food product, an environmental sample, or a water sample.

10. The method of any one of Claims 1-9, wherein the sample comprises up to 50% of serum albumin by weight.

CLAIMS

1. A method of forming a complex between a prion protein and a prion protein binding material in a sample comprising contacting the sample with the prion protein binding material under conditions allowing formation of the complex between the prion protein and the prion protein binding material, wherein the prion binding material comprises a functional group, wherein the functional group is a hydrophilic, a hydrophobic, or an amphiphilic functional group.

2. The method of Claim 1, further comprising separating the complex from the sample.

3. The method of Claims 1 or 2, further comprising detecting the complex.

4. The method of any one of the Claims 1-3, wherein the functional group is a primary amine group, a secondary amine group, a tertiary amine group, a quaternary amine group, an amine group, a sulfite group, a sulfonyl group, a tresyl group, an alkyl group, an aromatic group, a phenyl group, a butyl group, a siloxane group, or a fluorinated group.

5. The method of any one of Claims 1-4, wherein the functional group is selected from the group consisting of:

a) $-OCH_2-CHOH-CH_2NH_2$;

b) $-C_6H_5$;

c) $-(CH_2)_3-CH_3$;

d) $-CH_2-CH_2-N^+H(C_2H_5)_2$;

e) $-SO_2-CH_2-CF_3$;

f) $-CH_2-CH_2-N^+H(CH_3)_2$;

g) $-CH_2-CH_2-N^+(CH_3)_3$;

h) $-SO_3^{2-}$;

i) a diethylaminoethyl group;

j) a dimethylaminoethyl group; and

k) a trimethylaminoethyl group.

6. The method of any one of Claims 1-5, wherein the binding material comprises aluminum or silica.

7. The method of any one of Claims 1-6, wherein the binding material comprises a polymer matrix. .

8. The method of any one of Claims 1-7, wherein the polymer matrix is a polymethacrylate, a methacrylate, a FRACTOGEL™ EMD, a TOYOPEARL™, or a TSK-GEL™ polymer matrix.

9. The method of any one of Claims 1-8, wherein the sample is a biological sample, a food product, an environmental sample, or a water sample.

10. The method of any one of Claims 1-9, wherein the sample comprises up to approximately 50% of serum albumin by weight.

11. The method of any one of Claims 1-10, wherein the prion binding material comprises a spacer attached to the functional group.