materials are polymer particles, preferably chromatographic resins, that bind with selectivity and specificity to prion analytes. In other embodiments, the binding materials are inorganic materials that bind with selectivity and specificity to prion analytes. The binding materials are capable of binding to one or more forms of prion protein including cellular prion protein (PrPc), infectious prion protein (PrPsc), and recombinant prion protein (PrPr). Prions from various species, including humans and hamsters, are bound by the binding materials. Compositions containing the binding materials on a support such as a chromatography column are also provided.

The binding materials are useful for detecting, binding to, isolating, removing, eliminating, extracting or separating a prion protein in or from a sample, such as a biological fluid or an environmental sample. The binding materials are used to remove all forms of prion protein from a sample or can be selectively chosen to detect or remove a single form of prion protein. The binding materials can, therefore, be used to distinguish between infectious and non-infectious prion protein in a sample from patients afflicted with human TSEs and animals afflicted with scrapie, BSE and CWD. In one embodiment, one or more prion proteins are removed from a biological fluid using the binding materials described herein and the purified or decontaminated biological fluid is then administered, or returned, to an animal or human. Hemodialysis techniques may be employed in this embodiment. The binding materials are also useful for the detection of one or more prion proteins in a sample.

Another aspect of the invention provides a method for identifying additional binding materials, particularly binding materials specific for the conformationally altered forms of proteins, some of which are involved in the development of diseases.

Another aspect of the invention provides a method of detecting or separating and for removing 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.

Other features and advantages of the invention will be apparent from the following detailed description and preferred embodiments.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 is a photograph of a Western blot showing the binding of endogenous PrPc from human plasma samples to prion binding materials and appropriate controls.

Figure 2 is a photograph of a Western blot showing the binding of PrPsc from scrapie brain homogenate to prion binding materials and appropriate controls.

Figure 3 is a photograph of a Western blot demonstrating the capture of PrPc by prion binding materials in samples containing human serum albumin and appropriate controls.

SEQUENCE LISTING

<110> American Red Cross
North Carolina State University
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<120> Prion Protein Binding Materials and Methods of Use

<130> 51821-0111WP (51821-299536)

<150> US 60/460,474
<151> 2003-04-04

<160> 1

<170> PatentIn version 3.2

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