



Chronic Method for Isolating and Concentrating PrP^{RES} for Detection at Extremely Low Concentrations (VA Reference No. 02-052)

Novel method for the isolation and concentration of protease-resistant prions from dilute solutions

Technology

Method for isolation and concentration of protease-resistant prions

Inventor

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Key Features

- Detects low concentrations of PrP^{RES} protein
- Cost effective methodology
- Could be used in a variety of biological samples

Stage of Development

Reduced to practice

Keywords

Diagnostic

- Transmissible spongiform encephalopathy
- TSE
- Mad cow disease
- Creutzfeldt–Jakob disease
- Protease-resistant prions

Patent Status

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Technology

The Department of Veterans Affairs has developed a novel method of isolating and concentrating protease-resistant prions from dilute solutions and complex protein mixtures.

Description

The best molecular marker for TSE disease is currently the protein called the prion protein, or PrP. This membrane-bound glycoprotein is found in a variety of tissues of normal host animals, in a normal conformation. In TSE-infected individuals, the conformation of some of the normal PrP protein becomes altered and results in a change in a number of biochemical properties. The abnormal protein is called PrP^{RES} because it is (partially) resistant to degradation by the enzyme Protease K under conditions in which normal cellular PrP, PrP^C, is completely degraded. Any assay aimed to specifically detect PrP^{RES} must be able to distinguish PrP^{RES} from normal host PrP^C.

The method developed by the VA involves the use of an affinity resin column in combination with specific binding and elution protocols for isolation and concentration of the abnormal PrP^{RES} protein. The technology can be used in the enhancement of existing confirmatory post-mortem tests for TSE and will aid in the development of ante-mortem detection methodology. Additionally, this technology has utility in monitoring product infectivity and validation of prion inactivation for a variety of manufacturing protocols including serum albumin, plasma fractionation, and medical grade collagen and gelatin processing.

Competitive Advantage

The most commonly used method for detection of PrP^{RES} is a biochemical test based on the separation of proteins in a sample by gel electrophoresis, followed by recognition of the PrP protein by a specific antibody. However, this method by itself is not sensitive enough to detect very low levels of PrP^{RES}.

This invention:

- Can detect PrP^{RES} in dilute solutions and complex protein mixtures.
- Offers enhanced assay sensitivity, specificity and reproducibility, and is adaptable for use with current detection methodology.

Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license, and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).