



Adsorptive Membrane for Removal of Virus from Proteins, Particularly Antibodies

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WARF: P06012US

Inventors: Mark Etzel

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an inexpensive adsorptive membrane that provides an alternative to column chromatography for viral removal during bioprocessing of human therapeutic proteins.

Overview

Removal of virus is essential for the manufacture of safe biotechnology-derived products such as therapeutic monoclonal antibodies. Currently, virus is removed using ion exchange chromatographic resin. Because this material is expensive, it is designed for cleaning and regeneration. As a result, viruses need to be reversibly bound to the resin so they can be removed during the regeneration step, which also is an expensive process.

Adsorptive membranes are relatively inexpensive, disposable materials currently used in protein purification. However, these membranes are not designed to bind to viruses.

The Invention

A UW-Madison researcher has developed an adsorptive membrane that irreversibly binds viruses while allowing a protein of interest to pass through. Because most viruses are negatively charged at neutral pH and monoclonal antibodies are positively charged, the membrane contains a positively charged ligand that attracts virus while repelling antibody. However, because ion attraction alone is not sufficient for separation at high salt concentrations that disrupt ionic interactions, salt-tolerant, multimodal, anion-exchange ligands are used. When a virus-containing protein solution is passed through the membrane, the virus is irreversibly trapped while the antibody passes through.

Applications

- Removal of virus during biomanufacturing of human therapeutic proteins

Key Benefits

- Provides an inexpensive alternative to current chromatographic technology
- Virus removal is more controlled.
- Viruses bind more quickly to the membrane ligands.
- Virus can be bound in high salt solutions.
- Eliminates labor-intensive chromatograph column packing and validation
- Reduces floor space and equipment requirements
- Streamlines regulatory compliance
- In addition to virus, other impurities such as endotoxin, DNA and host-cell protein also are removed.

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WARF
Wisconsin Alumni Research Foundation

| info@warf.org | 608.960.9850

Additional Information

For More Information About the Inventors

- [Mark Etzel](#)

Related Technologies

- [WARF reference number P09314US02 describes additional virus-binding ligands that can be used to modify the membrane or other substrate.](#)

Related Intellectual Property

- [View Continuation Patent in PDF format.](#)
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Tech Fields

- [Research Tools : Synthesis & purification](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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