

High Affinity Viral Capture Human Decoy Based Proteins for Detection and Protection Against SARS-CoV-2 and Zoonotic Threats

Tech ID: 34695 / UC Case 2020-548-0

ABSTRACT

Researchers at the University of California, Davis have developed engineered amyloid fibrils composed of modified β -solenoid proteins fused with pathogen-binding domains that provide ultra-sensitive, stable, and versatile platforms for detecting viruses and other pathogens.

FULL DESCRIPTION

This technology uses genetically engineered β -solenoid proteins (BSPs) modified to self-assemble into amyloid fibrils that are functionalized with pathogen-binding proteins such as receptor decoys or binding motifs. These fibrils offer exceptional stability and multivalent binding capabilities, enabling them to tightly capture pathogens like SARS-CoV-2, HBV, or HCV from biological samples. The pathogen-binding proteins can mimic natural cell receptor sites (e.g., ACE2 helix-turn-helix domain) or other tightly binding peptides. The fibrils can be linked to solid supports or nanoparticles and integrated into diagnostic assays or protective coatings. This innovation allows detection with improved sensitivity, durability, and cost-effectiveness compared to conventional antibody-based methods.

APPLICATIONS

- ▶ Point-of-care diagnostic assays for infectious diseases including COVID-19, HBV, and HCV.
- ▶ Rapid environmental pathogen monitoring and biosurveillance tools.
- ▶ Development of coated personal protective equipment and antiviral surfaces.
- ▶ Biotechnological research tools for pathogen capture and detection.
- ▶ Multiplexed biosensors and lab-on-paper formats for clinical diagnostics.
- ▶ Low-cost lateral flow assays and immunoassays utilizing engineered amyloid scaffolds.
- ▶ Therapeutic decoy development for viral neutralization.
- ▶ Fluorescent and chromogenic labeling assays compatible with mobile detection platforms.
- ▶ Customizable bioscaffold platforms for detection of novel and emerging pathogens.
- ▶ Industrial and clinical bio-sample screening and point-of-need testing.

FEATURES/BENEFITS

- ▶ Achieves extremely high binding affinity and avidity through multivalent amyloid fibril scaffolds, enhancing diagnostic sensitivity and lowering detection thresholds.
- ▶ Maintains stability under harsh environmental conditions, including extreme pH, temperature, and denaturants.
- ▶ Enables cost-effective, scalable production via standard microbial expression systems.

CONTACT

Ediz O. Yonter

eoyonter@ucdavis.edu

tel: .



INVENTORS

- ▶ Cox, Daniel
- ▶ Toney, Michael D.

OTHER INFORMATION

KEYWORDS

amyloid fibril,
 diagnostics, pathogen
 detection, β -solenoid
 protein, multivalency,
 receptor decoy, SARS-
 CoV-2, antiviral coating,
 microbial expression,
 point-of-care

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
- ▶ **Medical**
 - ▶ Diagnostics
 - ▶ Disease:
 - [Infectious Diseases](#)
- ▶ **Nanotechnology**
 - ▶ NanoBio

- ▶ Adopts a modular design for fusion with diverse pathogen-binding proteins, supporting broad-spectrum and multiplexed detection.
- ▶ Immobilizes binding scaffolds on solid supports like paper, facilitating low-cost, robust point-of-care tests.
- ▶ Integrates fluorescent or chromogenic labeling for direct, sensitive pathogen detection.
- ▶ Rapidly adapts to new or emerging pathogens using biopanning methods to identify novel pathogen-binding peptides.
- ▶ Reduces false negatives and enhances detection windows by improving sensitivity and utilizing receptor decoy technology instead of antibodies.
- ▶ Provides a universal platform adaptable to zoonotic and emerging pathogens, supporting field and resource-limited settings.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230174599	06/08/2023	2020-548

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Biological Conversion of Ethylene to n-Butanol and Other Chemicals Using E. Coli](#)
- ▶ [Self-Assembled Modified Beta Solenoid Protein Scaffolds for Devices and Materials](#)

University of California, Davis

Technology Transfer Office

1 Shields Avenue, Mrak Hall 4th Floor,
Davis, CA 95616

Tel:

530.754.8649

techtransfer@ucdavis.edu

<https://research.ucdavis.edu/technology-transfer/>

Fax:

530.754.7620

© 2026, The Regents of the University of California

[Terms of use](#)

[Privacy Notice](#)