Innovations
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

# Phage Lambda Capsids as Tunable Display Nanoparticles

## Product

Nanoparticle Assembly System

## Indication

Drug delivery

## Value Propositions

- Diagnostic and therapeutic applications
- Enhanced cellular targeting and uptake
- Improved pharmacokinetic profiles

## Market

- $83.4 billion—Global nanoparticles drug delivery market (8.2% CAGR 2020-2025)

## Intellectual Property

- Issued US Patent*
- Available for Exclusive & Non-Exclusive Licensing

## Background on CU4489H

Viral-based therapeutic and diagnostic nanoparticles require optimization for each new particle design and control of display density can be difficult, especially if decoration with multiple ligands is desired. Current phage-based display systems are limited to peptide and protein fusion constructs expressed within infected cells in the context of an infectious virus. As a result, the stoichiometry of the fusion proteins cannot be controlled on the resulting infectious viral particles, fusion is limited to the N or C terminus, and the modified constructs are limited to peptide and protein display ligands.

## Technical Innovation

The inventors developed a hybrid nanoparticle assembly system that harnesses bacteriophage lambda as a homogeneous surface platform onto which multiple ligands can be displayed in a tunable manner. The concept has been successfully tested in vitro and in vivo for HER2+ breast cancer (antibody + protein) and bladder cancer (antibody + DNA). By decorating a phage-like particle with a targeting compound and a typical chemotherapeutic, technology permits selective targeting of desired cells and favors internalization of the drug, resulting in prolonged inhibition of cell growth compared to standard drug delivery methods. Technology allows for simultaneous display of both proteinaceous and non-proteinaceous ligands in a site-specific, modular fashion meaning ligands can be appended at multiple points on the decoration protein to minimize interference and optimize presentation. Additionally, permits attachment of desired ligand in specific ratios to enhance cellular targeting and uptake of the particle, to avoid immune surveillance, and/or to improve the pharmacokinetic profile of the particles.

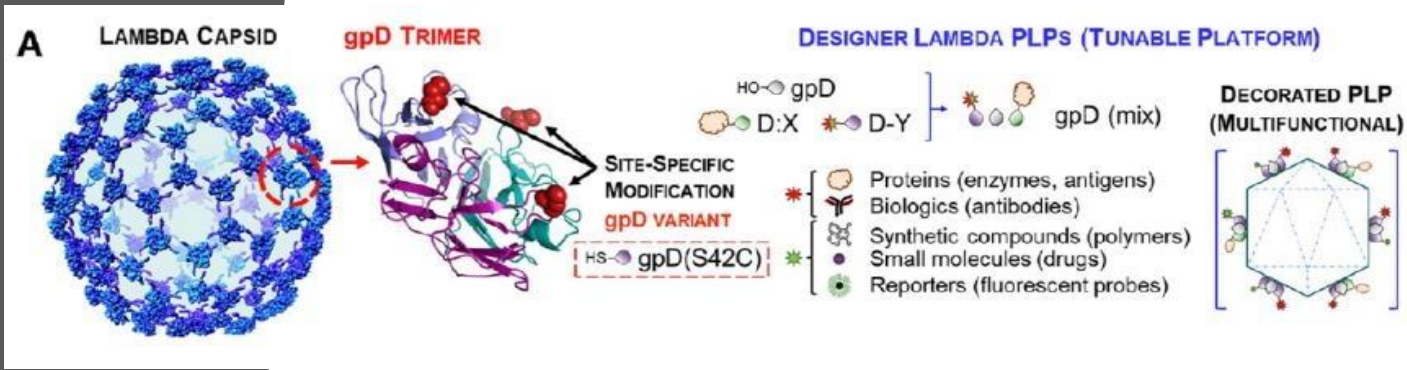


**Figure:** Schematic of proposed nanoparticle assembly system


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*Phage Lambda Capsids as Tunable Display Nanoparticles. Patent No. 10,562,938