

**Docket #:** S20-368

# Highly concentrated phage therapy suspensions stabilized with annexin V

Stanford researchers have developed high-titer bacteriophage and annexin V formulations for rapid, more effective phage therapy against bacterial infection.

Multi-drug resistant bacteria are a growing threat that is driving innovation in phage therapies as new antibacterials with high specificity and negligible side effects. However, key issues remain, including the risk of phage-resistant mutations arising in bacteria and a tendency for phage to precipitate out of solution.

The inventors have developed a phage therapy formulation that overcomes these challenges using annexin V, an enzymatically inert human protein that has already been tested in clinical trials. Annexin V binds to the negatively charged bacteriophage coat, stabilizing phage preparations of up to  $10^{12}$  plaque forming units per milliliter (pfu/ml), instead of the standard  $10^7$  to  $10^8$  pfu/ml. These highly concentrated preparations potentially allow direct phage lysis, which would speed up treatment and therefore reduce the chance of resistance mutations.

## Stage of Development

*In vitro/in vivo.* The formulation rapidly resolves otherwise-lethal *Pseudomonas aeruginosa* wound infection in mice.

## Applications

- Stabilized, highly concentrated phage and annexin V preparations for:
  - Antibacterial phage therapy
  - Radiolabeled studies of bacterial infection biodistribution

## Advantages

- More concentrated phage potentially facilitates:
  - Direct phage lysis, also known as "lysis from without"
  - Faster treatment
  - Reduced chance of resistance mutations
- Less frequent phage precipitation
- Easier shipment and long-term storage

## Patents

- Published Application: [WO2022108951](#)
- Published Application: [20240016886](#)

## Innovators

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## Licensing Contact

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