

Lung-Targeting Nanobodies and Purification Methods

A new approach for combating infectious disease at lower dose frequencies and amounts by directly delivering enhanced potency therapeutics.

US Patent Pending

Technology Readiness Level 4

The combination of high-throughput screening, functional validation assays and sophisticated bioinformatic tools to develop highly potent, neutralizing antibodies has generated novel avenues for designing effective medical countermeasures against a range of diseases and infections. Although the discovery pipeline of therapeutic antibodies has evolved to be increasingly rapid, there are a variety of existing hurdles that have not yet been addressed in the field of antibody design. Notably the cost of design and production, stability, and serum half-life – all of which can lead to the need for larger, more frequent doses, and increased financial burden on drug companies to generate large quantities efficiently.

Sandia researchers recently employed their proprietary nanobody (VHH) Phage library and biopanning pipeline to identify novel tissue-targeting nanobodies. These small tissue-targeting moieties can be attached to a given antibody or nanoparticle to achieve targeted delivery of a drug to the desired tissue or reservoir of infection namely for respiratory illnesses of the lung. The ability to deliver therapeutics directly to the affected tissue can

decrease the size and frequency of dosing and improve therapeutic outcomes by virtue of this targeted approach, thereby reducing the financial challenges of producing large quantities rapidly.

Technical Benefits

- Highly diverse nanobody phage library has been successfully applied to identifying novel pathogen neutralizing nanobodies; it is now providing novel lung-targeting nanobodies
- Can be used in a modular fashion to generate multifaceted engineered antibodies with tissue specificity as well as pathogen binding capabilities
- Provides enhanced anti-viral specificity as well as pathogen binding capabilities
- Provides enhanced anti-viral potency for a given tissue or reservoir of infection (e.g. SARS-CoV-2 Ab targeted to the lung) and reduce the amount/dose needed for efficacy

Industries & Applications

- Immunology
- Biomedical engineering
- Cancer

Next Steps

Sandia is seeking partners to develop and commercialize this technology. To learn more, contact Sandia National Laboratories' Licensing and Technology Transfer office.

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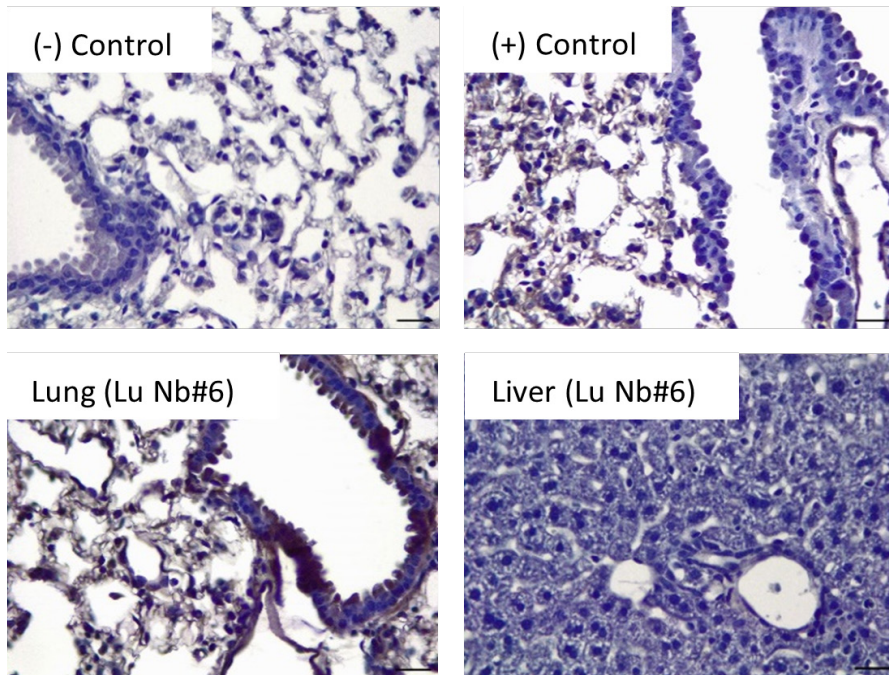


Figure 1: Immunohistochemistry (IHC) readout of nanobody localization and specificity within the lung tissue

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