

## **Nanobodies Neutralizing Lassa Virus**

### **Summary**

The National Cancer Institute (NCI) seek parties interested in collaborative research and/or licensing to further develop neutralizing nanobodies targeting Lassa virus as a possible treatment of Lassa virus infections.

### **NIH Reference Number**

E-099-2021

### **Product Type**

- Therapeutics

### **Keywords**

- Lassa, Virus, Nanobodies, Neutralizing, Lassa Hemorrhagic Fever, LHF, Antibodies, Diagnostic, Ho

### **Collaboration Opportunity**

This invention is available for licensing and co-development.

### **Contact**

- David Lambertson  
NCI TTC

[david.lambertson@nih.gov](mailto:david.lambertson@nih.gov) (link sends e-mail)

### **Description of Technology**

Lassa Hemorrhagic Fever (LHF) is a serious disease caused by infection with Lassa virus (LASV) – highly prevalent in West Africa and spreading globally. LASV is associated with high morbidity and mortality rates, annually infecting 100,000 to 300,000 individuals and causing 5,000 deaths. Developing prophylactics and treatment for LASV is difficult due to challenges in inducing neutralizing antibodies and producing their target, the LASV glycoprotein trimer (GPC). LASV poses a severe public health threat with infections expanding outside the traditional endemic areas and no LHF- specific vaccines or therapies.

Researchers at NCI's Laboratory of Molecular Biology, in collaboration with the Vaccine Research Center at the National Institute of Allergy and Infectious Diseases, developed and isolated six nanobodies with high binding affinity for the LASV envelop protein. Nanobodies are the smallest known antigen-binding fragments of antibodies. They have

great potential as research tools and in medical applications due to their (1) small size, (2) high solubility, (3) thermal stability, (4) refolding capacity, and (5) relatively easy tissue penetration,.

The nanobodies D5 and C3 show the most potent neutralizing activities. These nanobodies neutralized LASV Josiah pseudotyped virus when prepared in a bivalent IgG2a format as human IgG Fc-fusion. Overall, it is evident that the nanobodies can be used and developed into therapeutics that that neutralize Lassa virus.

Researchers at the National Cancer Institute (NCI) seek parties interested in collaborative research and/or licensing to further develop neutralizing nanobodies targeting Lassa virus.

### **Potential Commercial Applications**

- Therapeutics against Lassa virus infection
- Lassa virus diagnostics (in vivo virus imaging)

### **Competitive Advantages**

- No LSV-specific vaccines or treatments
- First stabilized, soluble LASV glycoprotein trimer
- Nanobodies with high affinity for the LASV GPC trimer
- Nanobodies compete with 4 different groups of human neutralizing antibodies
- Nanobodies neutralize LASV when prepared in a human IgG Fc-fusion

### **Inventor(s)**

Mitchell Ho Ph.D. (NCI), Peter Kwong Ph.D (NIAID), Zhijian Duan (NCI), Yaping Sun (NCI), Sao Fong Na Cheung (NIAID ), Jason J Gorman (NIAID)

### **Development Stage**

- Discovery (Lead Identification)

### **Patent Status**

- **U.S. Provisional:** U.S. Provisional Patent Application Number 63/181,519, Filed 29 Apr 2021

### **Therapeutic Area**

- Infectious Diseases

### **Updated**

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