Back to Search Results

Description

Details

Sub-Projects

Publications

Patents

Outcomes

Clinical Studies

News and More

History

Similar Projects

Tropism, pathogenicity, and potential for zoonotic spillover of emergent henipa- and henipa-like viruses

Project Number
5R01AI123449-04

Contact PI/Project Leader
LEE, BENHUR

Awardee Organization
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

Description

Abstract Text

ABSTRACT Nipah (NiV) and Hendra (HeV) viruses are highly pathogenic type species of the Henipavirus (HNV) genus within the Paramyxovirinae. Zoonotic transmission of NiV and HeV from their natural fruit bat reservoirs to humans can result in mortality rates in excess of 90%. Originally thought to be limited to Southeast Asia and Australia, the recent discovery of numerous divergent clades of HNVs across Africa, and of Henipa-like viruses (HNLV) in China such as the Mojiang paramyxovirus (MojPV), qualitatively changes the risk- calculus associated with the possible global emergence of these zoonotic viruses. Indeed, we recently found evidence for HNV spillover into human populations at high-risk for zoonotic transmission in Cameroon, which raise urgent questions about potential spillover events that may have remained undetected or misdiagnosed. The recent Ebola epidemic in West Africa underscores the importance of understanding the mechanisms of zoonotic spillover and transmission of highly pathogenic emerging viruses. HNVs use EphrinB2 and EphrinB3, highly conserved cellular proteins, as viral entry receptors. The recent discovery of novel HNVs with differential usage of EphrinB2 and B3 provides new opportunities to study how receptor usage contributes to the pathogenicity and potential for zoonotic spillover of these emergent HNVs. Our overall goal is to elucidate the envelope-receptor interactions of HNVs and HNLVs that contribute to viral tropism, pathogenicity, transmissibility, and the potential for zoonotic spillover. Our primary objective is to understand the structure-function correlates of envelope- receptor interactions in the pathobiology of HNV/HNLV zoonotic infections. A secondary objective is to leverage that understanding to interrogate the rational basis for a vaccine design that might elicit antibodies that are more broadly neutralizing and effective against an ever-expanding spectrum of diverse HNVs. Our driving hypothesis is: the structural plasticity of HNV-Gs accounts for the differential efficiency and choice of receptor usage exhibited by divergent HNVs, and that this contributes to a virulence spectrum among these zoonotic viruses that is equally diverse. To achieve our objectives and interrogate our driving hypothesis, we propose the following Specific Aims: (1) Investigate the role of receptor usage and choice in virus pathogenicity. (2) Evaluate how attachment protein-receptor interactions contribute to transmissibility and the potential for zoonotic spillover. (3) Examine the implications of the structural and phylogenetic diversity of HNVs on vaccine design.

Public Health Relevance Statement

NARRATIVE Henipaviruses (HNVs) are emerging paramyxoviruses that are classified as BSL4 select agents due to their extreme pathogenicity. They are zoonotic viruses that can cause severe disease in humans and livestock when spillover occurs from the natural animal reservoirs. We seek to understand the viral envelopereceptor interactions that contribute to viral pathogenicity and the potential for zoonotic spillover.

NIH Spending Category

Biodefense | Emerging Infectious Diseases | Infectious Diseases | Rare Diseases

Project Terms

Africa | Animals | Antibodies | Australia | Automobile Driving | Binding Sites | Brain Stem | Calculi | Cameroon | China | Chiroptera | Complex | Disease | Ebola virus | Encephalitis | Epidemic | Event | Exhibits | Fruit | Ghana

Back to Search Results

Description

Details
Sub-Projects
Publications
Patents
Outcomes
Clinical Studies
News and More
History
Similar Projects

Tropism, pathogenicity, and potential for zoonotic spillover of emergent henipa- and henipa-like viruses

Project Number
5R01AI123449-04

Contact PI/Project Leader
LEE, BENHUR

Awardee Organization
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

Details

Contact PI/ Project Leader

Name
LEE, BENHUR

Title
PROFESSOR OF MICROBIOLOGY

Contact
BENHURL@MICROBIO.UCLA.EDU

Other PIs

Not Applicable

Program Official

Name
PARK, EUN-CHUNG

Contact
epark@niaid.nih.gov

Organization

Name
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

City
NEW YORK

Country
UNITED STATES (US)

Department Type
MICROBIOLOGY/IMMUN/VIROL(

Organization Type
SCHOOLS OF MEDICINE

State Code
NY

Congressional District
13

Other Information

FOA
PA-13-302

Study Section
Virology - B Study Section[VIRB]

Fiscal Year
2019

Award Notice Date
06-August-2019

Administering Institutes or Centers
NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

DUNS Number
078861598

CFDA Code
855

Project Start Date
26-September-2016

Project End Date
31-August-2021

Budget Start Date
01-September-2019

Budget End Date
31-August-2020

Project Funding Information for 2019

Total Funding
$584,782

Direct Costs
$463,139

Indirect Costs
$121,643

Year	Funding IC	
2019	NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES	$584,782

NIH Categorical Spending

Click here for more information on NIH Categorical Spending

Funding IC	FY Total Cost by IC	NIH Spending Category

Thank you for your feedback!

Back to Search Results

Description

Details

Sub-Projects

Publications

Patents

Outcomes

Clinical Studies

News and More

History

Similar Projects

Tropism, pathogenicity, and potential for zoonotic spillover of emergent henipa- and henipa-like viruses

Project Number
5R01AI123449-04

Contact PI/Project Leader
LEE, BENHUR

Awardee Organization
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

Sub Projects

No Sub Projects information available for 5R01AI123449-04

Publications

No Publications available for 5R01AI123449-04

Patents

No Patents information available for 5R01AI123449-04

Outcomes

The Project Outcomes shown here are displayed verbatim as submitted by the Principal Investigator (PI) for this award. Any opinions, findings, and conclusions or recommendations expressed are those of the PI and do not necessarily reflect the views of the National Institutes of Health. NIH has not endorsed the content below.

No Outcomes available for 5R01AI123449-04

Clinical Studies

No Clinical Studies information available for 5R01AI123449-04

News and More

Related News Releases

No news release information available for 5R01AI123449-04

History

No Historical information available for 5R01AI123449-04

Back to Search Results

Tropism, pathogenicity, and potential for zoonotic spillover of emergent henipa- and henipa-like viruses

Description

Details

Sub-Projects

Publications

Patents

Outcomes

Clinical Studies

News and More

History

Similar Projects

Project Number
5R01AI123449-04

Contact PI/Project Leader
LEE, BENHUR

Awardee Organization
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI