Back to Search Results

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

Project 3: Nucleoside-modified mRNA-LNP vaccine platform

Parent Project Number	Sub-Project ID	Contact PI/Project Leader	Awardee Organization
1P01AI158571-01A1	6382	HAYNES, BARTON F.	DUKE UNIVERSITY

Description

Abstract Text

ABSTRACT - Project 3 Coronaviruses havethe potential to cause significant morbidity andmortality as demonstrated by the ongoing SARS-CoV-2 pandemic. The purpose of this program project is to develop safe and broadly-protective group 2b and 2c betacoronavirus (panbetaCoV) vaccines capable of inducing protective immune responses and evaluate them in animal challenge models. The fact that there has been 3 major CoV outbreaks (SARS-CoV-1, MERS and SARS-CoV-2) in less than 20 years strongly supports the idea of generation of broadly protective panbetaCoV vaccines that can significantly contribute to global pandemic preparedness against future CoV epidemics and pandemics. Coronaviruses (CoVs) have significant pandemic potential, as illustrated by the outbreaks of SARS-CoV-1, MERS and SARS-CoV-2 in less than 20 years. The outbreak of a novel CoV, SARS- CoV-2, has resulted in at over 85 million infections and 1.8 million deaths. Thus, development of panbetaCoV vaccines is essential to preventing a future outbreaks due to an emerging new zoonotic CoV. Messenger RNA/LNP-based vaccines have proved to be highly effective against cancer and infectious diseases and one of the most effective platforms comprises nucleoside-modified **mRNA** (mod **mRNA**) encapsulated in LNPs. Two of the leading COVID-19 vaccines in phase 3 clinical trials by Moderna and Pfizer/BioNTech use our nucleoside-modified **mRNA**-LNP **vaccine** platform and are 95% protective in Phase 3 trials. Besides potency, **mRNA**/LNPs can undergo rapid, scalable production and induced durable immune responses. In Project 3, we propose to develop cross-protective and safe mod **mRNA**-LNP vaccines against animal and human betaCoVs and evaluate their immunogenicity and protective efficacy in preclinical studies. We hypothesize that mod **mRNA**-LNP vaccines encoding CoV immunogens capable of inducing broadly protective and broadly cross-protective B and T cell responses will effectively provide protection against future outbreaks of zoonotic CoVs.. We propose the following Specific Aims: Aim 1) Development of neutralizing antibody panbetaCoV vaccines using mod **mRNA**-LNP. Aim 2) Development of T cell vaccines using mod **mRNA**-LNP. In summary, this proposal aims to develop panbetaCoV vaccines that are safe, easy-to-produce and can induce protective immune responses in animal challenge models. The data generated will be capable of moving this panbetaCoV **vaccine** approach to clinical development.

Public Health Relevance Statement

Data not available.

Project Terms

2019-nCoV · Address · Adjuvant · Adverse event · Age · Animal Model · Animals · Antibody Response · Antigens · B-Lymphocytes · COVID-19 pandemic · COVID-19 **vaccine** · Cell Surface Proteins · Cessation of life · Collaborations · Communicable Diseases · Coronavirus · Coronavirus Infections · Country · Data · Development · Disease · Disease Outbreaks · Ebola virus · Elderly · Encapsulated · Epidemic · Epithelial Cells · Evaluation · Ferritin · Future · Generations · Glycoproteins · Goals · Helper-Inducer T-Lymphocyte · Human · Human Herpesvirus 2 · Immune · Immune response · Infection · Length

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Back to Search Results

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

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not available

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Organization

Name
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Country
UNITED STATES (US)

Department Type
Unavailable

Organization Type
Domestic Higher Education

State Code
NC

Congressional District
04

Other Information

FOA
PAR-20-072

Study Section
Special Emphasis Panel[ZAI1 JP-W (S1)]

Fiscal Year
2021

Award Notice Date
16-September-2021

Administering Institutes or Centers
NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

DUNS Number
044387793

CFDA Code

Project Start Date
16-September-2021

Project End Date
31-August-2024

Budget Start Date
21-September-2021

Budget End Date
31-August-2024

Project Funding Information for 2021

Total Funding
$1,904,954

Direct Costs
$1,859,349

Indirect Costs
$45,605

Year	Funding IC	
2021	NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES	$1,904,954

Sub Projects

No Sub Projects information available for 1P01AI158571-01A1 6382

Publications

No Publications available for 1P01AI158571-01A1 6382

Patents

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Back to Search Results

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

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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 1P01AI158571-01A1 6382

Clinical Studies

No Clinical Studies information available for 1P01AI158571-01A1 6382

News and More

Related News Releases

No news release information available for 1P01AI158571-01A1 6382

History

No Historical information available for 1P01AI158571-01A1 6382

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