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Project 3: Nucleoside-modified mRNA-LNP vaccine platform

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Parent Project

Number

[1P01AI158571-](#)[01A1](#)

Sub-Project ID

[6382](#)

Contact

PI/Project Leader

[HAYNES,](#)[BARTON F.](#)

Awardee

Organization

[DUKE](#)[UNIVERSITY](#)

Description

Abstract Text

ABSTRACT - Project 3 Coronaviruses have the potential to cause significant morbidity and mortality 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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Parent Project Number	Sub-Project ID	Contact	Awardee
1P01AI158571-01A1	6382	PI/Project Leader HAYNES, BARTON F.	Organization DUKE UNIVERSITY

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Title	not available
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[!\[\]\(3211b5d1d968fc1665909b34f9f16010_img.jpg\) Sub-Projects](#)

Title	FREDERIC M HANES PROF OF MED
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[!\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\) Publications](#)

Contact	HAYNE002@MC.DUKE.EDU
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[!\[\]\(9c2e8d1b5bd77cb5c9f83b7a9cff79fd_img.jpg\) Patents](#)[!\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\) Outcomes](#)

Organization

[!\[\]\(235bfe13ebf007ce2eea9e689707fac7_img.jpg\) Clinical Studies](#)

Name	DUKE UNIVERSITY
City	DURHAM
Country	UNITED STATES (US)

[!\[\]\(83bbbd261710c59db0214aa27b2edc0d_img.jpg\) News and More](#)

Department Type	Unavailable
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[!\[\]\(291e070cef6c4d5e78fefe4696ef53be_img.jpg\) History](#)

Organization Type	Domestic Higher Education
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[!\[\]\(f507db636256ac11a5525ef93ec6b8d7_img.jpg\) Similar Projects](#)

State Code	NC
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Congressional District	04
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Other Information

FOA	Administering Institutes or Centers
PAR-20-072	NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

Project Start Date	16-September-2021
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Study Section	DUNS Number
Special Emphasis Panel[ZAI1 JP-W (S1)]	044387793 CFDA Code

Project End Date	31-August-2024
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Award Notice Date	Budget Start Date
16-September-2021	21-September-2021

Budget Start Date	21-September-2021
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Fiscal Year	Budget End Date
2021	31-August-2024

Budget End Date	31-August-2024
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Project Funding Information for 2021

Total Funding	Direct Costs	Indirect Costs
\$1,904,954	\$1,859,349	\$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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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

Similar Projects

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

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