Back to Search Results

Description

Details

Sub-Projects

Publications

Patents

Outcomes

Clinical Studies

News and More

History

Similar Projects

Transfer of COVID-19 Immunity Between

Parent Project Number	Sub-Project ID	Contact PI/Project Leader	Awardee Organization
3P50CA107399-13S1	5267	FORMAN, STEPHEN JOther PIs	BECKMAN RESEARCH INSTITUTE/CITY OF HOPE

Description

Abstract Text

SUMMARY Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the causative agent of the ongoing coronavirus disease 2019 (**COVID**-19) pandemic. The United Patients with serious underlying medical conditions, including immunocompromised cancer patients undergoing hematopoietic cell transplantation, are at higher risk of severe illness from **COVID**-19. Along with investigations coronavirus epidemic is progressively increasing in the States and other countries with the number of global cases and deaths still climbing. into the virology of SARS-CoV-2, understanding the fundamental immunity of **COVID**-19 is vital for the rational design of effective therapies. Cellular therapy represents a novel immunotherapeutic modality to treat patients with severe **COVID**-19 infections. SARS-CoV-2 specific T cells have been detected in most **COVID**-19 patients; however, there is lack of detailed analysis of the effectiveness and longevity of the virus specific T cells in protecting patients from subsequent SARS-CoV-2 infection. Moreover, immunogenic T cell epitopes have not yet been described, especially for CD4+ T cells critical for linking the cellular and humoral immune responses. The overall goal of this project is to isolate, characterize, and expand SARS-CoV-2 specific T cells to therapeutic doses to provide effective immunotherapy for patients with severe **COVID**-19 infections. We hypothesize that adoptive transfer of SARS-CoV-2 specific T cells will a) elicitCD4+ and CD8+cellular immunity in patients with current **COVID**-19 infections; b) persist following adoptive transfer; c) be available for immediate use as off-the-shelf products in an HLA-dependent manner. In our Specific Aims, we propose to extensively investigate the cellular immunity of SARS-CoV-2 specific T cells isolated from patients with previous **COVID**-19 infections by measuring levels of virus-specific T cells in blood of people with previous **COVID**-19 infections, characterizing the memory and exhaustion T cell phenotype, and evaluating function against viral antigen in vitro and in vivo. Our team's experience with adoptive immunotherapeutic approaches using virus specific T cells against cytomegalovirus (CMV) and other viruses combined with our established platform for the isolation and expansion of CMV specific T cells, will allow for the rapid large-scale generation of SARS-CoV-2 specific T cells with an array of HLA types and provide an off-the-shelf T cell product for immediate use. Further, by using the novel MHC-PepSeq technology, we will identify immunogenic epitopes restricted by MHC II molecules, which will assist candidate vaccine design and facilitate evaluation of vaccine candidate immunogenicity. Our proposed studies will provide scientific insights into SARS-CoV-2 cellular immunity, which may have broad implications for patients with **COVID**-19. Moreover, our proposed manufacturing platform will allow us to develop off-the-shelf SARS-CoV-2 specific T cells with different HLA types, which will have a major clinical impact on treatment of patients with severe illness from **COVID**-19.

Public Health Relevance Statement

NARRATIVE There are limited therapeutic options to treat patients who develop severe coronavirus disease (COVID-19) caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Adoptive cellular therapy using SARS-CoV-2 specific T cells isolated from patients who have recovered from COVID-19 represents a novel immune-based therapy to treat patients with COVID-19. The proposed studies aim to isolate, characterize and expand SARS-CoV-2 specific T cells for use as an off-the-shelf T cell product to treat patients with COVID-19.

NIH Spending Category

Biotechnology Cancer Coronaviruses Emerging Infectious Diseases Health Disparities Immunization Immunotherapy Infectious Diseases Minority Health Transplantation Vaccine Related

Back to Search Results

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

Transfer of COVID-19 Immunity Between

Parent Project Number	Sub-Project ID	Contact PI/Project Leader	Awardee Organization
3P50CA107399-13S1	5267	FORMAN, STEPHEN JOther PIs	BECKMAN RESEARCH INSTITUTE/CITY OF HOPE

CD4 Positive T Lymphocytes CD8-Positive T-Lymphocytes CD8B1 gene COVID-19 COVID-19 pandemic Cancer Patient Cell Therapy Cells Cellular Immunity Cellular immunotherapy Cessation of life Cities Clinical Coronavirus Country Cytomegalovirus DNA Data Development

Read More

Details

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UNITED STATES (US)

Department Type
Unavailable

Organization Type
Research Institutes

State Code
CA

Congressional District
32

Other Information

FOA
PA-18-591

Study Section
ZCA1(O1)

Award Notice Date
23-September-2020

Fiscal Year
2020

Administering Institutes or Centers
NATIONAL CANCER INSTITUTE

DUNS Number
027176833

CFDA Code

Project Start Date
01-September-2020

Project End Date
31-August-2023

Budget Start Date
01-September-2020

Budget End Date
31-August-2021

Project Funding Information for 2020

Total Funding	Direct Costs	Indirect Costs
$176,000	$100,000	$76,000

Year	Funding IC	FY Total Cost by
2020	NATIONAL CANCER INSTITUTE	

Thank you for your feedback!

Back to Search Results

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

Transfer of COVID-19 Immunity Between

Parent Project Number	Sub-Project ID	Contact PI/Project Leader	Awardee Organization
3P50CA107399-13S1	5267	FORMAN, STEPHEN JOther PIs	BECKMAN RESEARCH INSTITUTE/CITY OF HOPE

Transplantation; Vaccine Related;

Sub Projects

No Sub Projects information available for 3P50CA107399-13S1 5267

Publications

No Publications available for 3P50CA107399-13S1 5267

Patents

No Patents information available for 3P50CA107399-13S1 5267

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 3P50CA107399-13S1 5267

Clinical Studies

No Clinical Studies information available for 3P50CA107399-13S1 5267

News and More

Related News Releases

No news release information available for 3P50CA107399-13S1 5267

History

No Historical information available for 3P50CA107399-13S1 5267

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Back to Search Results

Transfer of COVID-19 Immunity Between

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

Parent Project Number	Sub-Project ID	Contact PI/Project Leader	Awardee Organization
3P50CA107399-13S1	5267	FORMAN, STEPHEN J Other PIs	BECKMAN RESEARCH INSTITUTE/CITY OF HOPE