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Patterns of immune response in COVID-19 patients

Project Number
1ZIABC011952-01

Contact PI/Project Leader
KREITMAN, ROBERT

Awardee Organization
DIVISION OF BASIC SCIENCES - NCI

Description

Abstract Text

Patients infected with **COVID**-19 have an unpredictable risk to worsen and die, making it difficult to decide who can quarantine at home and who should be monitored for respiratory failure as an inpatient. This risk may be related in part to the patient's immune response which can be characterized with respect to the B- and T-cell repertoire. Determining patterns of immune response and correlating them with clinically effective immunity may help in determining risk in a patient who is acutely infected. Patients on **COVID**-19 vaccine trials are typically tested for antibody production, protection from infection and survival. If such patients can be checked for a favorable pattern of immune response, which can be defined by the research of this protocol, it may significantly speed selection of effective candidate vaccines. RNA viruses depend on polyamines for their reproduction, including Middle East respiratory syndrome coronavirus (MERS-CoV). The rate limiting enzyme in polyamine catabolism is spermine/spermidine acetyl-transferase (SAT1). SAT1 is increased during Zika virus-triggered innate immune response, and RNA-sequencing data from a recently published study demonstrates that SAT1 expression is increased in lung cell lines infected with **COVID**-19. SAT1 generates diacetylspermine, and evidence suggests that diacetylspermine pathological tissue production directly correlates with urine levels. Therefore, urine diacetylspermine may be a prognostic biomarker to determine clinically effective immunity to **COVID**-19. Although poor pulmonary function, smoking, male sex, and age have been implicated as risk factors for poor response to **COVID**-19, we believe the immune system also plays a major role in the ability to recover from **COVID**-19. By defining the T- and B-cell repertoire in patients with active or past **COVID**-19 infection, the results of this study may help in 1) determining a pattern of immune response which will predict whether the patient will recover at home or will need close monitoring for respiratory failure; 2) determining if immune response to **COVID**-19 is primarily B- or T-cell mediated; and, 3) determining if future vaccine efforts are achieving the 'good prognosis' immune response, to insure that the vaccine will be successful.

Public Health Relevance Statement

Data not available.

NIH Spending Category

Biodefense Cancer Clinical Research Coronaviruses Emerging Infectious Diseases Health Disparities Immunization Infectious Diseases Lung Minority Health Prevention Rare Diseases Vaccine Related

Project Terms

Acute Age Antibody Formation B cell repertoire B-Lymphocytes **COVID**-19 **COVID**-19 vaccine Cell Line Clinical Data Enzymes Future Goals Home environment Immune response Immune system Immunity Infection Innate Immune Response Inpatients Lung

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Risk Risk Factors Role Smoking Speed Spermidine Spermine

Details

Contact PI/ Project Leader

Name
KREITMAN, ROBERT

Title

Contact
Email not available

Other PIs

Not Applicable

Program Official

Name

Contact
Email not available

Organization

Name
DIVISION OF BASIC SCIENCES - NCI

City

Country

Department Type
Unavailable

Organization Type
Unavailable

State Code

Congressional District

Other Information

FOA

Study Section

Fiscal Year
2020

Award Notice Date

Administering Institutes or Centers
NATIONAL CANCER INSTITUTE

DUNS Number CFDA Code

Project Start Date

Project End Date

Budget Start Date

Budget End Date

Project Funding Information for 2020

Total Funding
$400,855

Direct Costs
$0

Indirect Costs
$0

Year	Funding IC	FY Total Cost by
2020	NATIONAL CANCER INSTITUTE	$400,855

NIH Categorical Spending

Click here for more information on NIH Categorical Spending

Funding IC	FY Total Cost by IC	NIH Spending Category
DIVISION OF BASIC SCIENCES - NCI	$80,171	Health Disparities; Minority Health;
DIVISION OF BASIC SCIENCES - NCI	$400,855	Biodefense; Cancer; Clinical Research; Coronaviruses; Emerging Infectious Diseases; Immunization; Infectious Diseases; Lung; Prevention; Rare Diseases; Vaccine Related;

Sub Projects

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No Publications available for 1ZIABC011952-01

Patents

No Patents information available for 1ZIABC011952-01

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 1ZIABC011952-01

Clinical Studies

No Clinical Studies information available for 1ZIABC011952-01

News and More

Related News Releases

No news release information available for 1ZIABC011952-01

History

No Historical information available for 1ZIABC011952-01

Similar Projects

No Similar Projects information available for 1ZIABC011952-01