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Viral Zoonoses and Severe Febrile Illness in Northern Tanzania

Project Number	Contact PI/Project Leader	Awardee Organization
5K23AI116869-04	RUBACH, MATTHEW P	DUKE UNIVERSITY

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Description

Abstract Text

SUMMARY/ABSTRACT The objective of this proposal is to deploy standard as well as innovative diagnostic tools in order to investigate what proportion of severe febrile illness (SFI) in northern Tanzania is attributable to **emerging** zoonotic viral pathogens. Fever is among the most common reasons for seeking health care in less developed countries, yet up to half of patients hospitalized with fever in sub-Saharan Africa may go without a laboratory- confirmed diagnosis—this represents a serious knowledge gap that hinders **disease** prevention efforts. Prior research in northern Tanzania has revealed that animal-borne bacterial infections are a common cause of SFI, perhaps reflecting the effects of close interaction between humans, livestock and wildlife in many parts of sub- Saharan Africa. Yet the impact of animal-borne viral infections, such as henipa-, bunya-, corona- and reoviruses, remains unknown. An enhanced understanding of whether and which of these high- consequence viral pathogens are causing SFI is fundamental to the prevention and control of severe **infectious** diseases in sub-Saharan Africa and to the global health security agenda of the United States and other G7 countries. To these ends, this career development award proposes to utilize well- characterized archived blood specimens from prior fever etiology research in northern Tanzania in order to undertake the following SPECIFIC AIMS: SPECIFIC AIM 1—Establish the prevalence of exposure to zoonotic viral pathogens by performing antibody evaluations of serum from patients with SFI and from previously enrolled community-dwellers. SPECIFIC AIM 2— Establish the proportion of SFI cases with detectable viremia from select zoonotic pathogens by performing real- time polymerase chain reaction (PCR) assays on SFI patient blood samples. SPECIFIC AIM 3— Achieve enhanced viral pathogen detection and discover new viral pathogens by interrogating SFI blood samples with hybridization enrichment next-generation sequencing technology. The requisite laboratory work to achieve these SPECIFIC AIMS will be conducted at Duke-National University of Singapore Graduate Medical School (Duke-NUS) under the direction of the Candidate and the Director of the Duke-NUS Program in **Emerging Infectious Disease**, Lin-Fa Wang, PhD (K23 Co-Mentor), and Duke University/Duke-NUS faculty, Greg Gray, MD, MPH (K23 Co-Mentor). De-identified serum, plasma and whole blood will be utilized for these aims. These well-characterized blood specimens represent nearly 1500 patients enrolled in two febrile illness research cohorts conducted in northern Tanzania by K23 Primary Mentor, John Crump, MB ChB, MD: International Co-Studies of AIDS-Associated Co- Infections (U01 AI062563), a comprehensive fever etiology study; and The Impact and Social Ecology of Bacterial Zoonoses in Northern Tanzania (R01TW009237), an epidemiologic risk factor analysis on zoonotic causes of SFI. The Candidate, Matthew Rubach, MD, is a board-certified medical microbiologist and **infectious disease** physician. Dr. Rubach was stationed full-time in Moshi, Tanzania 2012-2014. He has engaged successfully in clinical research on febrile illness and the epidemiology of bacterial zoonotic infections under the mentorship of Dr. Crump and in the context of Dr. Crump's productive zoonoses research program, comprised of over 20 collaborating scholars from multiple disciplines. This institutional environment in Tanzania, the excellent mentorship team as well as directed coursework through the London School of Hygiene & Tropical Medicine MSc Epidemiology distance learning program will collectively enable the Candidate to achieve the following TRAINING OBJECTIVES: TRAINING OBJECTIVE 1—To develop further expertise in epidemiologic research, clinical research study design, and quantitative analysis (Drs. Crump & Gray; coursework). TRAINING OBJECTIVE 2 – To develop further expertise in the epidemiology of zoonotic infections (Drs. Crump & Gray; coursework). TRAINING OBJECTIVE 3—To develop further technical expertise in innovative diagnostic microbiology through mentored clinical research that utilizes novel pathogen detection and pathogen discovery laboratory techniques (Dr. Wang). Ultimately, Dr. Rubach aspires to improve **infectious disease** diagnostic capacity in resource-limited settings by conducting relevant clinical research as Duke University faculty stationed full-time at the KCMC- Duke University Health Research Collaboration in Moshi, Tanzania. This early career award will equip Dr. Rubach v technical expertise in innovative diagnostics that will differentiate him from his Primarv Mentor at

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Public Health Relevance Statement

PROJECT NARRATIVE (STATEMENT OF PUBLIC HEALTH RELEVANCE) Fever is one of the most common causes of hospitalization and death in sub-Saharan Africa, but the infections causing severe fever illnesses remain poorly understood. Capitalizing on a singular collection of de-identified blood specimens collected in our previous fever studies, we will use both standard and highly innovative infection detection approaches to determine to what extent emerging animal-borne viruses are responsible for severe fever illnesses in northern Tanzania. Given that these studies could enable the subsequent development of targeted interventions for prevention of severe illness due to high-consequence viruses with endemic and epidemic potential, this research is aligned with the global health security agenda of the United States government and other G7 countries.

NIH Spending Category

Biodefense	Clinical Research	Emerging Infectious Diseases	Infectious Diseases
Prevention			











Project Terms

Accounting	Acquired Immunodeficiency Syndrome	Adult	Africa	
Africa South of the Sahara	Animals	Antibodies	Arboviruses	Archives
Award	Bacterial Infections	Biological Assay	Blood Circulation	
Blood specimen	Brucella	Catchment Area	Cessation of life	Child
Clinical Research	Collaborations	Collection	Communicable Diseases	
Communities	Complex	Country	Coxiella burnetii	Cryptococcus neoformans
Data	Detection	Developing Countries	Development	Diagnosis
Diagnostic	Discipline	Disease	Distance Learning	Doctor of Philosophy
Read More				

Details

Contact PI/ Project Leader	Other PIs	Program Official
Leader	Not Applicable	Name
Name		BROWN, LILIANA L
RUBACH, MATTHEW P		Contact
		liliana.brown@nih.gov
Title		
ASSOCIATE PROFESSOR		
Contact		
matthew.rubach@duke.edu		
Organization		
Name	Department Type	State Code
DUKE UNIVERSITY	INTERNAL MEDICINE/MEDICINE	NC
City	Organization Type	Congressional District
DURHAM		
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Project Number 5K23AI116869-04		Contact PI/Project Leader RUBACH, MATTHEW P		Awardee Organization DUKE UNIVERSITY	
PA-14-U49		Centers		Date	2016
Study Section Microbiology and Infectious Diseases Advisory Committee [MID]		NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES		Project End Date	30-June-2021
Award Notice		DUNS Number	CFDA Code	Budget Start Date	01-July-2019
Fiscal Year 2019		044387793	855	Budget End Date	30-June-2020

Project Funding Information for 2019

Total Funding	Direct Costs	Indirect Costs
\$189,432	\$175,400	\$14,032

Year	Funding IC	
2019	NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES	\$189,432

NIH Categorical Spending

[Click here for more information on NIH Categorical Spending](#)

Funding IC	FY Total Cost by IC	NIH Spending Category
NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES	\$189,432	Biodefense; Clinical Research; Emerging Infectious Diseases; Infectious Diseases; Prevention;

Sub Projects

No Sub Projects information available for 5K23AI116869-04

Publications

No Publications available for 5K23AI116869-04

Patents











No Patents information available for 5K23AI116869-04

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.

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Clinical Studies

No Clinical Studies information available for 5K23AI116869-04

News and More

Related News Releases

No news release information available for 5K23AI116869-04

History

No Historical information available for 5K23AI116869-04

Similar Projects

No Similar Projects information available for 5K23AI116869-04

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