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Mucosal Vaccines for Brucellosis

Project Number Contact PI/Project Leader 5R01AI123244-05 PASCUAL, DAVID W

Awardee Organization UNIVERSITY OF FLORIDA

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Abstract Text

DESCRIPTION (provided by applicant): The highly infectious Gram-negative Brucella remains a global health threat and is responsible for the disease, brucellosis. In humans, B. melitensis is believed to be responsible for most infections, and it is naturally transmitted via ingestion of unpasteurized dairy products or aerosols of infected animal products resulting in infection of naso-oropharyngeal tissues. Although infection primarily occurs following a mucosal exposure, it can cause a systemic disease manifested by its flu-like symptoms. Despite aggressive antibiotic treatment, it can still result in a recurring sequelae evident as undulant fever and arthritis. Brucellae survival within the host is linked to its ability to evade intracellular recognition, thu, allowing them to sequester in various tissues. Vaccines that can recapitulate aspects of Brucella infection should prove effective in protecting against infection. Hence, we hypothesize that a vaccine that mimics aspects of natural mucosal B. melitensis infections and capable of stimulating cell-mediated immunity via the production of TNF-a and IFN-g will be protective against mucosal and systemic Brucella challenges. To enable this approach, we have recently developed a vaccine prototype that can confers complete protection in most cases with no detectable brucellae in spleens or lungs. Given the potency of this vaccine, we propose to test our hypothesis using two animal models to determine the efficacy of this vaccine against wild-type B. melitensis challenges. Studies in Specific Aim 1 will establish a mucosal (oral, nasal, or oral + nasal) immunization strategy for conferring protection to B. melitensis and to heterologous Brucella species. Studies in Specific Aim 2 will establish similar mucosal immunization strategy in goats, a natural host for B. melitensis, for conferring protection against B. melitensis-induced abortion. Studies in Specific Aim 3 will evaluate the biosafety of this vaccine to warrant future clinical testing. Thus, these studies will show that our oral/nasal vaccine can protect against Brucella challenges in two different experimental animal models.

Public Health Relevance Statement

PUBLIC HEALTH RELEVANCE: Brucellosis is the most common zoonotic disease worldwide, and this disease compromises mostly systemic tissues, including joints, spleen, and liver, requiring extended antibiotic treatment to clear the brucellae. The proposed studies will test the efficacy of our vaccine following its mucosal administration in two different animal models to learn how the induced T cells are protective against Brucella infections. The overall goal of this work is to show efficacy by our vaccine that can ultimately aid to reduce incidences of human disease.

NIH Spending Category

Biodefense Biotechnology Digestive Diseases Emerging Infectious Diseases Foodborne Illness

Immunization Infectious Diseases Orphan Drug Prevention Rare Diseases Vaccine Related

Project Terms

Acute Aerosols Affect Affinity Animals Antibiotic Therapy Adopted **Animal Model Antibiotics Attenuated Live Virus Vaccine Attenuated Vaccines** Brucella **Arthritis Benign Brucella Vaccine Brucella melitensis** Brucella suis **Brucella abortus Brucellosis** Cells **Cellular Immunity** Cholera **Communicable Diseases** DNA **Dairy Products** Chronic Clinical Experimental Animal Model Immune response **Immunization** Goat Headache Human **Immunity Impairment Induced Abortion** Infection Interferon Type II Interleukin-12 Incidence Ingestion **Intestines Joints** LacZ Genes Learning Life Link Liver Livestock Lung **Malaise** Meat

Read More

Details

Contact PI/ Project Leader

PASCUAL, DAVID W

Title

Title **PROFESSOR**

Other PIs

Not Applicable

Program Official

Name
ZOU, LANLING
Contact

Thank you for your feedback!

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Mucosal Vaccines for Brucellosis

Contact PI/Project Leader Project Number Awardee Organization 5R01AI123244-05 **PASCUAL, DAVID W UNIVERSITY OF FLORIDA**

UNIVERSITY OF FLORIDA MICROBIOLOGY/IMMUN/VIROLOGY FL

City Organization Type **Congressional District GAINESVILLE SCHOOLS OF VETERINARY** 03

MEDICINE

Country **UNITED STATES (US)**

Other Information

FOA Administering Institutes or Centers **Project Start** 20-January-PA-13-302 **NATIONAL INSTITUTE OF ALLERGY** Date 2016

AND INFECTIOUS DISEASES Study Section Project End Date 31-December-

Study Section[VMD] 969663814 855

DUNS Number

Fiscal Year Award Notice Date **Budget Start** 01-January-2020 07-January-2020 Date 2020

Budget End Date 31-December-

CFDA Code

2021

2021

Project Funding Information for 2020

Vaccines Against Microbial Diseases

Total Funding Direct Costs Indirect Costs \$388,659 \$280,106 \$108,553

Year	Funding IC	FY Total Cost by IC	
2020	NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES	\$388,659	

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	\$388,659	Biodefense; Biotechnology; Digestive Diseases; Emerging Infectious Diseases; Foodborne Illness; Immunization; Infectious Diseases; Orphan Drug; Prevention; Rare Diseases; Vaccine Related;

品 Sub Projects

No Sub Projects information available for 5R01Al123244-05

Publications

No Publications available for 5R01AI123244-05

Patents

No Patents information available for 5R01AI123244-05

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.

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Mucosal Vaccines for Brucellosis

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Project Number 5R01Al123244-05

Contact PI/Project Leader PASCUAL, DAVID W

Awardee Organization UNIVERSITY OF FLORIDA

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Related News Releases

No news release information available for 5R01Al123244-05

History

No Historical information available for 5R01Al123244-05

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No Similar Projects information available for 5R01Al123244-05