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# Vaccines Against Botulism

**Project Number**
5R01AI118389-05

**Contact PI/Project Leader**
BARBIERI, JOSEPH TOther PIs

**Awardee Organization**
MEDICAL COLLEGE OF WISCONSIN

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## Description

### Abstract Text

DESCRIPTION (provided by applicant): The botulinum neurotoxins (BoNT) are the most toxic proteins known for humans and the causative agent of botulism. BoNTs are organized into three domains that are involved in catalysis (LC), translocation (HCT), and receptor binding (HCR). There are now eight BoNT serotypes (A-H) based upon limited cross serotype protection of α-sera against each BoNT serotype. Currently, there is no licensed vaccine against botulism and the experimental penta-serotype toxoid vaccine previously available from the CDC for at-risk populations was discontinued in 2011. Thus, there is a need to develop a potent and effective BoNT vaccine against all BoNT serotypes to protect at-risk humans from exposure, including civilians in harm's way, first responders, the military, and researchers. Several approaches to generate new BoNT vaccines have not yielded a vaccine product. Two published vaccine approaches against botulism developed through collaborations between the Barbieri and Johnson laboratories include an HCR subunit vaccine that protected against challenge by the seven BoNT serotypes, and a full-length, atoxic BoNT (M-BoNT) vaccine that protected against BoNT/A challenge. HCRs are stable products made in large quantity, are nontoxic and not Select Agent regulated, thus making product development straightforward. The goal of this study is to optimize the HCR and M-BoNT vaccine platforms towards the generation of a pan-BoNT protective vaccine against foodborne and inhalation botulism. The hypothesis is that native BoNT or HCR derivatives that have been mutated to eliminate cell binding and catalytic activity will improve vaccine potency against all BoNT serotypes compared to toxoid vaccines, while enhancing safety and reducing vaccine side effects. The specific aims will utilize the complementary research expertise of both the Barbieri and Johnson laboratories. The aims will engineer a pan-BoNT serotype protective vaccine against botulism, using the mouse challenge model. Optimized vaccines will be tested for potency in food borne- and inhalation- models of botulism. These studies will produce the next generation vaccine against botulism and a strategy for rapid response to the release of BoNT variants.

### Public Health Relevance Statement

PUBLIC HEALTH RELEVANCE: The botulinum neurotoxins (BoNT) are the most toxic proteins known for humans and a potential bioterrorism weapon. Currently, there is no licensed vaccine against botulism. A BoNT vaccine would protect at-risk humans from exposure, including first responders, the military, and researchers. The proposed studies will produce the next generation vaccine against foodborne and inhalation botulism to protect against native BoNT as well as engineered BoNT variants.

### NIH Spending Category

Biodefense Biotechnology Emerging Infectious Diseases Foodborne Illness Immunization Infectious Diseases Orphan Drug Prevention Rare Diseases Vaccine Related

### Project Terms

Amino Acids Bacterial Proteins Bacteriology Binding Biochemistry Bioterrorism Bontoxilysin Botulinum Toxin Type A Botulism C-terminal Catalysis Cells Cellular biology Centers for Disease Control and Prevention (U.S.) Clostridium botulinum Collaborations Cytosol Engineering Epitopes Escherichia coli GTP-Binding Protein alpha Subunits, Gs Gangliosides Generations Goals Gold Human Immune Immune response Individual Inhalation Intoxication Laboratories Length Light Link Military Personnel Modeling Molecular Biology Mus Mutagenesis Mutate Mutation N-terminal Neurons Notification Pentas Pichia Populations at Risk Post-Translational Protein Processing Proteins

Read More

## Details

### Contact PI/ Project Leader

Name
BARBIERI, JOSEPH T

### Other PIs

Name
JOHNSON, ERIC A. PELLETT, SABINE

### Program Official

Name
RANALLO, RYAN

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**Awardee Organization**
MEDICAL COLLEGE OF WISCONSIN

Name
**MEDICAL COLLEGE OF WISCONSIN**
City
**MILWAUKEE**
Country
**UNITED STATES (US)**

Department Type
**MICROBIOLOGY/IMMUN/VIROLOGY**
Organization Type
**SCHOOLS OF MEDICINE**

State Code
**WI**
Congressional District
**05**

## Other Information

FOA
**PA-13-302**
Study Section
**Vaccines Against Microbial Diseases Study Section[VMD]**
Fiscal Year
**2019**
Award Notice Date
**07-January-2019**

Administering Institutes or Centers
**NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES**
DUNS Number
**937639060**
CFDA Code
**855**

Project Start Date **15-July-2015**
Project End Date **31-May-2020**
Budget Start Date **01-January-2019**
Budget End Date **31-May-2020**

## Project Funding Information for 2019

Total Funding
**$578,347**
Direct Costs
**$473,047**
Indirect Costs
**$105,300**

| Year | Funding IC | FY Total Cost by IC |
|---|---|---|
| 2019 | NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES | $578,347 |

## 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 | $578,347 | Biodefense; Biotechnology; Emerging Infectious Diseases; Foodborne Illness; Immunization; Infectious Diseases; Orphan Drug; Prevention; Rare Diseases; Vaccine Related; |

## Sub Projects

No Sub Projects information available for 5R01AI118389-05

## Publications

No Publications available for 5R01AI118389-05

## Patents

No Patents information available for 5R01AI118389-05

## 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.

No Outcomes available for 5R01AI118389-05

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## News and More

**Related News Releases**

No news release information available for 5R01AI118389-05

## History

No Historical information available for 5R01AI118389-05

## Similar Projects

No Similar Projects information available for 5R01AI118389-05

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