U.S. Army-developed Zika Vaccine

Rapid Countermeasure Development

The U.S. Army Medical Research and Materiel Command (USAMRMC) has developed a Zika Purified Inactivated Virus (ZPIV) vaccine candidate. Led by researchers at the Walter Reed Army Institute of Research (WRAIR), and working in collaboration with government, industry and academia partners, the U.S. Army research team moved from an initial concept of a Zika vaccine to two high impact publications within 180 days and into clinical studies within 10 months.

Zika Virus and Threat to U.S. Force Health

Zika virus (ZIKV) is an emerging virus that, since early 2015, has caused an increased incidence of systemic disease and neurologic complications.

U.S. military members and families are at higher risk for Zika virus infection than the general U.S. population. Military members often deploy to tropical areas with active transmission of Zika and other members of the flavivirus family (e.g. dengue, yellow fever, Japanese encephalitis). Further, most military bases in the U.S. are concentrated in the South, where climate conditions and mosquito populations are favorable for Zika transmission.

There is no specific treatment or prophylactic currently available for Zika, other than supportive care and mosquito control. Given the expanding distribution and significant morbidity associated with ZIKV disease, a safe and effective vaccine against Zika is a global public health priority.

Biosurveillance is the first step in identifying and countering emerging infectious diseases. WRAIR's Armed Forces Research Institute of Medical Sciences (AFRIMS), in Bangkok, identified Zika in Thailand and the Philippines by 2013. These early efforts and access to the virus gave Institute researchers a head start in vaccine development.

WRAIR's Flavivirus Expertise

The WRAIR Pilot Bioproduction Facility pivoted to making a Zika vaccine within months of the Zika outbreak reaching U.S. shores.

Institute researchers decided to move forward with the purified inactivated virus vaccine because it builds on a type of vaccine that has been licensed before. It is the same technology WRAIR used to develop its Japanese encephalitis vaccine, which was licensed in 2009.

100% Efficacy in Preclinical Studies

WRAIR and collaborators at Beth Israel Deaconess Medical Center and Harvard Medical School published the findings of a preclinical study in the journal *Nature* in June 2016, where they showed 100% efficacy of the ZPIV vaccine in preventing Zika virus infection in vaccinated mice.

Findings from another preclinical study published as the cover article in the journal *Science* in August 2016 confirmed and extended the prior studies by demonstrating 100% protection in rhesus macaque monkeys against infection with both Brazilian and Puerto Rican strains of Zika virus.

2015

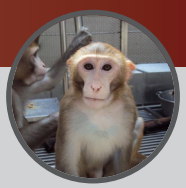
NOVEMBER
First case of Zika in USA

2016

FEBRUARY
WRAIR starts production of Zika vaccine, ZPIV

JUNE
ZPIV provides 100% protection in mice

AUGUST
ZPIV provides 100% protection in rhesus monkeys



NOVEMBER
Human Phase I clinical studies begin with ZPIV

Phase 1 Clinical Trials

Human testing of ZPIV began at WRAIR's Clinical Trials Center in Silver Spring in November, 2016. Additional human trials are ongoing in the United States, supported by the DoD and the National Institute of Allergy and Infectious Diseases (NIAID). The trials are looking at different populations, dosing and vaccination schedules.

One trial is evaluating a single dose or accelerated vaccine schedule, which is salient to vaccine deployment in the setting of an emergent outbreak.

Ongoing ZPIV Vaccine Clinical Trials

WRAIR
Silver Spring, MD
Previous flavivirus immunity

Saint Louis University (SLU)
St. Louis, MO
Dose optimization

Harvard BIDMC
Boston, MA
Accelerated schedule

University of Puerto Rico/ Saint Louis University
Ponce, PR
Natural flavivirus immunity

Emerging Infectious Disease Threats

WRAIR's expertise and research infrastructure enable the U.S. Military to quickly respond to new health threats.

Advancing Ebola Vaccine Development

- Established research infrastructure and partnerships for multi-site vaccine testing in the U.S. and Africa
- Five Ebola vaccine studies ongoing or recently completed in the U.S. and Africa
- Completed first Ebola vaccine study in Africa and conducted largest long-term follow-up

Developing MERS Countermeasures

- Middle East Respiratory Syndrome (MERS) has infected more than 1,600 people and killed nearly 40% of those infected
- WRAIR is collaborating across sectors to research, develop and test solutions for emerging MERS threat
- Conducting trial of first MERS vaccine to be tested in humans

Joint West Africa Research Group (JWARG)

- Leveraging existing research platforms and relationships to improve biopreparedness and health diplomacy in the region
- Collaborative effort led by U.S. Army and Navy, government and academic institutions. Partners build upon existing programs in Nigeria, Ghana and Liberia
- Initiatives focus on lab strengthening, biosurveillance and countermeasure development

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About the Walter Reed Army Institute of Research

Headquartered in Silver Spring, Maryland, the Walter Reed Army Institute of Research (WRAIR) dates back to 1893 and is the most diverse biomedical research laboratory in the Department of Defense. WRAIR provides unique research capabilities and innovative solutions to a range of Force Health and Readiness challenges currently facing U.S. Service Members, along with threats anticipated during future operations. **www.wrair.army.mil | 301-319-9471 | @WRAIR**

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