

**Hearing of the House Foreign Affairs Committee,  
Subcommittee on Africa, Global Health, Global Human Rights, and  
International Organizations,  
And Subcommittee on the Western Hemisphere**

**Research Conducted and Supported  
by the National Institutes of Health  
in Addressing Zika Virus Disease**

**Anthony S. Fauci, M.D.  
Director**

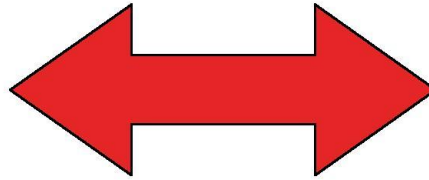
**National Institute of Allergy  
and Infectious Diseases  
National Institutes of Health  
February 10, 2016**



# **NIAID Research: A Dual Mandate**

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**Maintain and “grow” a robust basic and applied research portfolio in microbiology, infectious diseases, immunology and immune-mediated diseases**



**Respond rapidly to new and emerging disease threats**



**New/Improved Interventions**



The  
New England  
Journal of Medicine

Established in 1812 as THE NEW ENGLAND JOURNAL OF MEDICINE AND SURGERY

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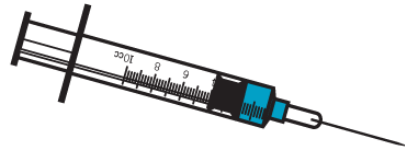
published online January 13, 2016

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# **Zika Virus in the Americas – Yet Another Arbovirus Threat**

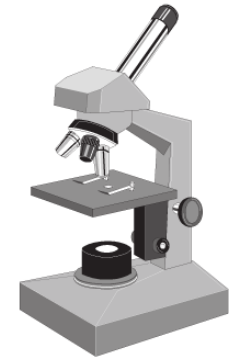
**AS Fauci and DM Morens**



**Vaccines**



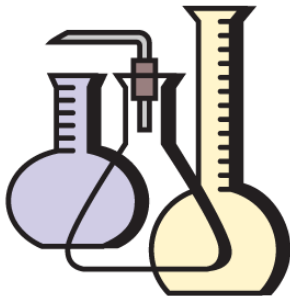
**Therapeutics**



**Diagnostics**



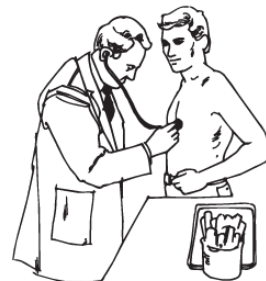
**NIH  
Countermeasure  
Research and  
Development**



**Basic Research**



**Resources for  
Researchers/  
Industry to  
Advance  
Product  
Development**



**Clinical  
Research**

# **Biomedical Research Response: Epidemiology and Natural History**

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## **■ Epidemiology and natural history**

- Symptomatic vs. asymptomatic**
- Frequency of sequelae**

## **■ Pathogenesis of microcephaly**

# **Biomedical Research Response: Basic Science**

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- **Molecular Virology: a) elucidate viral structure; b) compare viruses from different outbreaks**
- **Pathogenesis of disease**
- **Studies on immune response (innate and adaptive)**
- **Establish animal models**

# **Biomedical Research Response: Vector Control**

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- **Vector competence: Ability of mosquitoes other than *Aedes aegypti* to carry and transmit Zika virus**
- **Novel insecticides**
- **Novel vector control methods**

# **Biomedical Research Response: Diagnostics**

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- **CDC – Diagnostic and Reference Laboratory in Arbovirus Diseases Branch**
- **RT-PCR assay for Zika, Dengue and Chikungunya**
- **Antibody assay for acute infection that will not cross-react with other flaviviruses**



# **Biomedical Research Response: Countermeasures – Vaccines**

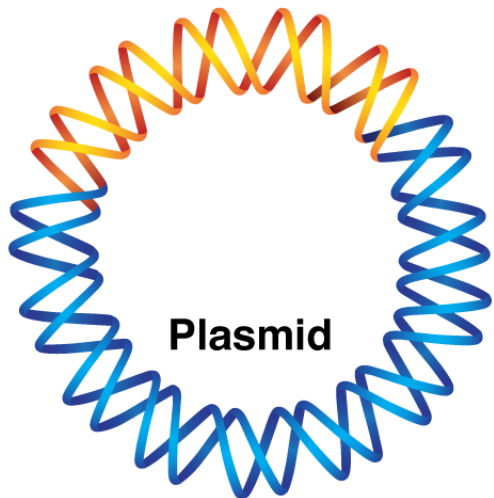
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- **DNA vaccine – success with West Nile Virus**
- **Live-attenuated vaccine (for non-obstetric population) – success with dengue**

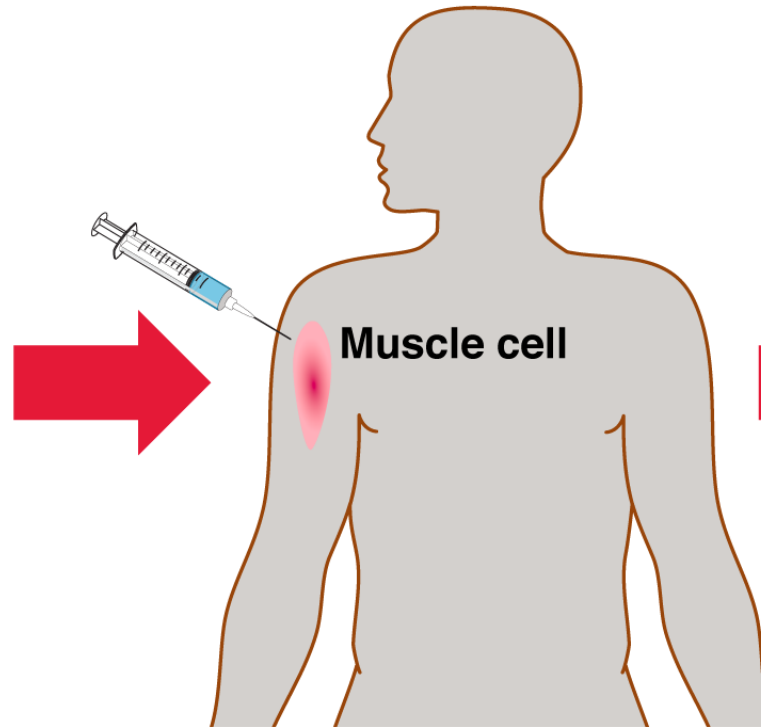
# DNA Vaccine Approach

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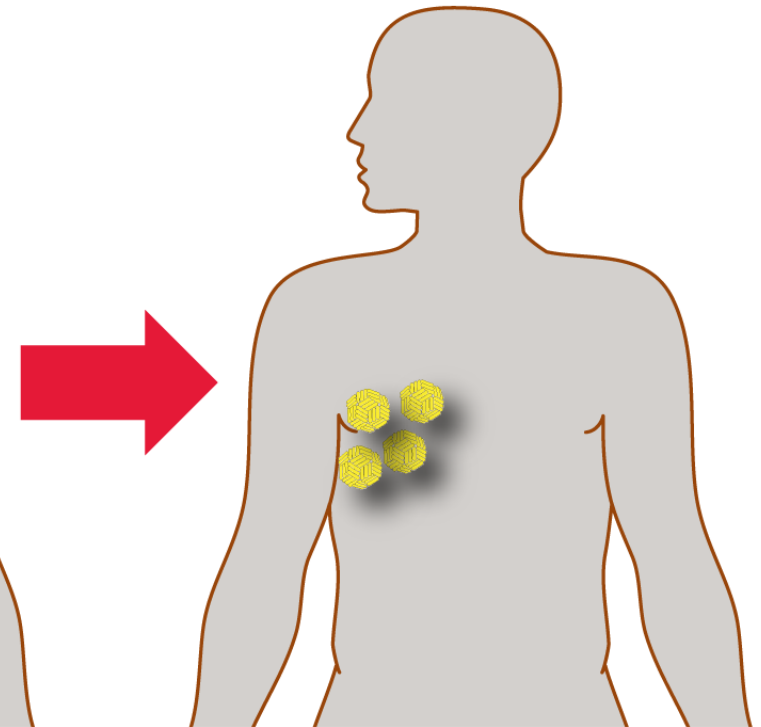
Gene encoding surface protein from Zika virus



Inject DNA containing Zika gene



Body's cells produce virus-like particles, the basis of the vaccine



# **Biomedical Research Response: Countermeasures – Therapeutics**

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- **Developed *in vitro* antiviral screening assay**
- **Testing compounds with known activity against other flaviviruses**
- **Broad screening of compounds without known anti-flavivirus activity**
- **“Targeted” antiviral approach – similar to HIV and Hepatitis C**

Volume 8, Issue 11

November 2008

**THE LANCET** Infectious Diseases



# **Emerging Infections: A Perpetual Challenge**

**DM Morens, GK Folkers & AS Fauci**

