

M & I  
Microbiology  
and Immunology  
University of North Carolina at Chapel Hill

## THESIS SEMINAR

**Nathaniel Schramm**

**“Pharmacological and immunological control of  
Zika virus replication in mice deficient in adaptive  
immune responses.”**

Friday, March 29, 2019  
9:30 a.m.  
6004 Marsico Hall

Thesis Advisor: Dr. Victor Garcia-Martinez

Presented in partial fulfillment of the requirements for the degree of  
Master of Science

## ABSTRACT

**Nathaniel Schramm:** Pharmacological and immunological control of Zika virus replication in mice deficient in adaptive immune responses  
(Under the direction of Victor Garcia-Martinez)

Zika virus (ZIKV) has recently demonstrated epidemic potential with prolonged infection, sexual and mother to fetus transmission, severe clinical manifestation of fetal microcephaly and congenital malformations and Guillain-Barré syndrome in adults. Existing small animal models for ZIKV infection based on interferon (IFN)-deficient mice are not well suited for long-term assessment of therapeutics. Here, we show that in contrast to immunocompetent mice that control ZIKV infection and IFN-deficient mice that rapidly succumb to infection, immunodeficient mouse strains lacking T, B, and NK cells support systemic ZIKV replication for long periods of time. Using these immunodeficient mice, we evaluated the efficacy of 7-Deaza-7-fluoro-2'-C-methyl-adenoside (DFMA), a small molecular inhibitor and a neutralizing antibody (C10) to suppress systemic ZIKV replication in vivo. DFMA treatment resulted in efficient and sustained viral suppression. Treatment with C10 also resulted in viral suppression in highly clinically relevant tissues like the brain, eyes, gastrointestinal tract, and male and female reproductive organs.