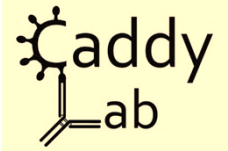
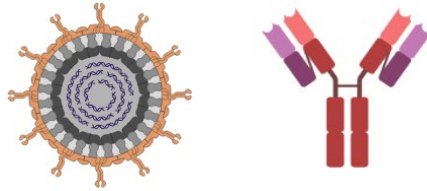


Cornell University®



Mechanisms of maternal antibody interference to oral rotavirus vaccination

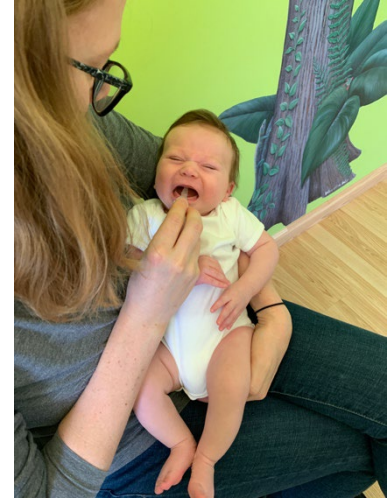


Sarah Caddy

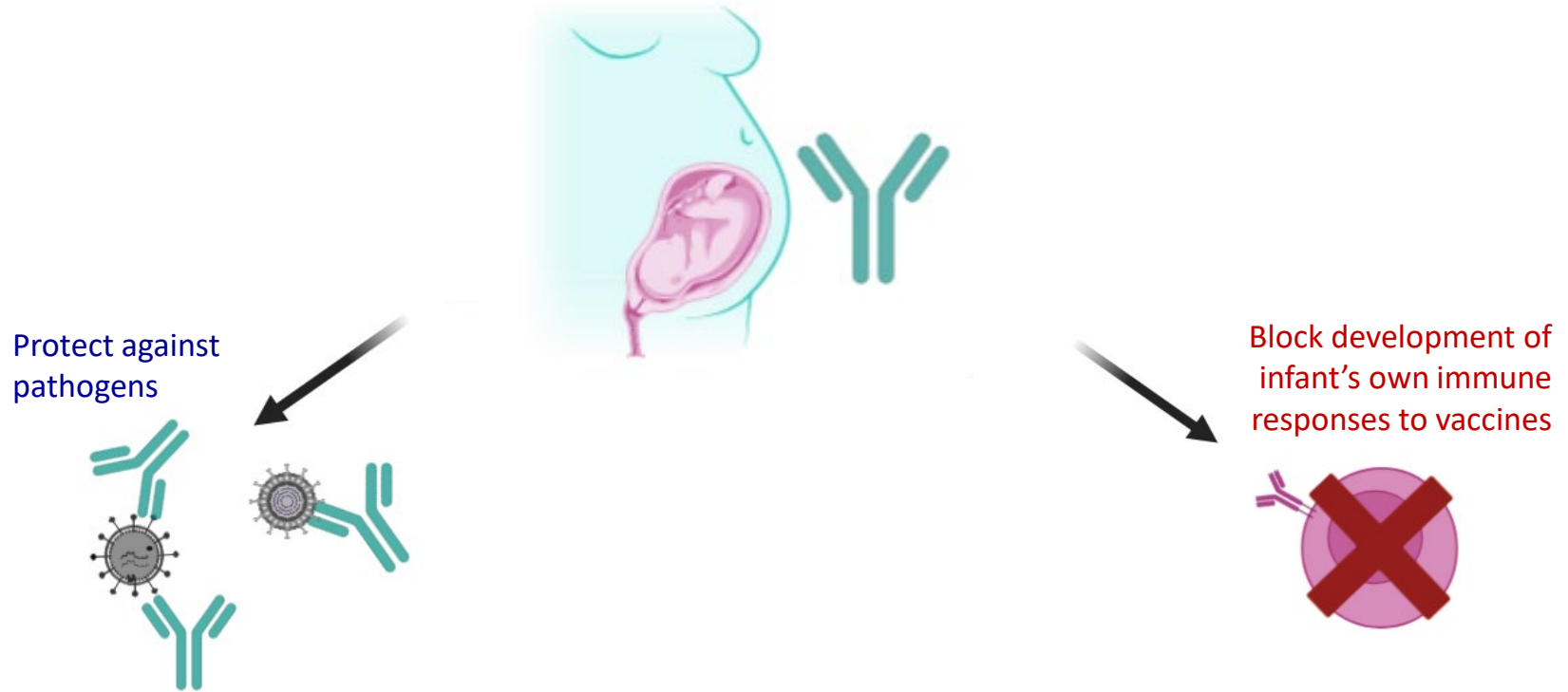
MA VetMB PhD DACVM FRCVS

Assistant Professor

Baker Institute, Cornell University



Maternal antibodies



Maternal antibody interference with rotavirus vaccination

Clinical Infectious Diseases

MAJOR ARTICLE



Prevaccination Rotavirus Serum IgG and IgA Are Associated With Lower Immunogenicity of Live, Oral Human Rotavirus Vaccine in South African Infants

Sung-Sil Moon,¹ Michelle J. Groom,^{2,3} Daniel E. Velasquez,¹ Umesh D. Parashar,¹ Stephanie Jones,^{2,3} Antoinette Koen,^{2,3} Nadia van Niekerk,^{2,3} Baoming Jiang,¹ and Shabir A. Madhi^{2,3,4}

RESEARCH ARTICLE

Association of Maternal Immunity with Rotavirus Vaccine Immunogenicity in Zambian Infants

Roma Chilengi^{1,2*}, Michelo Simuyandi¹, Lauren Beach¹, Katayi Mwila¹, Sylvia Becker-Dreps², Devy M. Emperador³, Daniel E. Velasquez³, Samuel Bosomprah¹, Baoming Jiang³



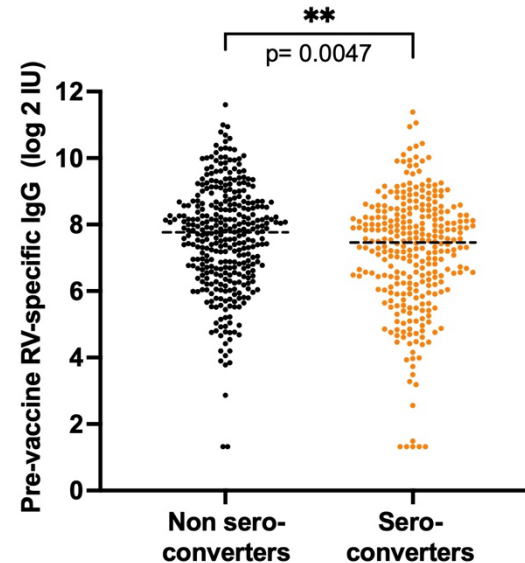
ARTICLE

<https://doi.org/10.1038/s41467-021-27074-1>

OPEN

Impact of maternal antibodies and microbiota development on the immunogenicity of oral rotavirus vaccine in African, Indian, and European infants

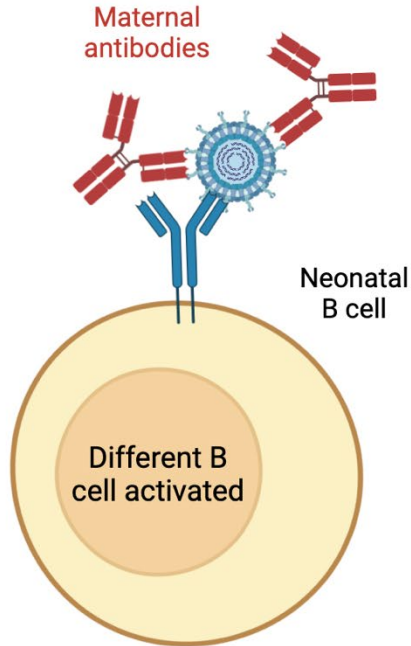
Edward P. K. Parker^{1,1100}, Christina Bronowski^{2,11}, Kulandaipalayam Natarajan C. Sindhu^{3,11}, Sudhir Babji³,



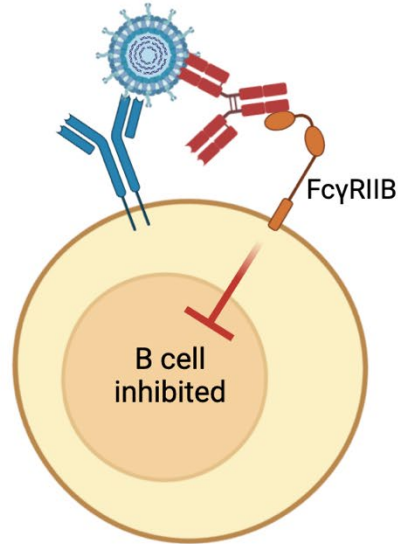
See poster: Identification of maternal, genetic and clinical factors that influence rotavirus vaccine efficacy in Vietnam

Possible mechanisms of interference

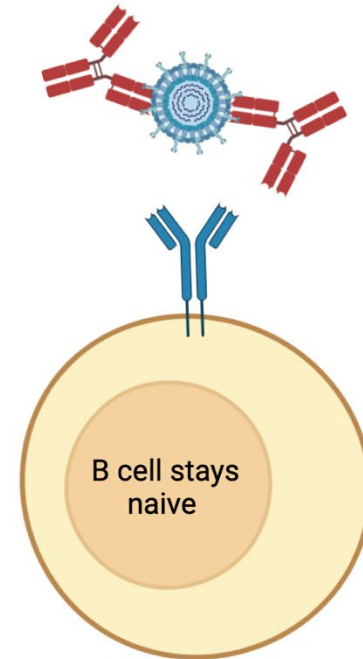
Epitope Masking



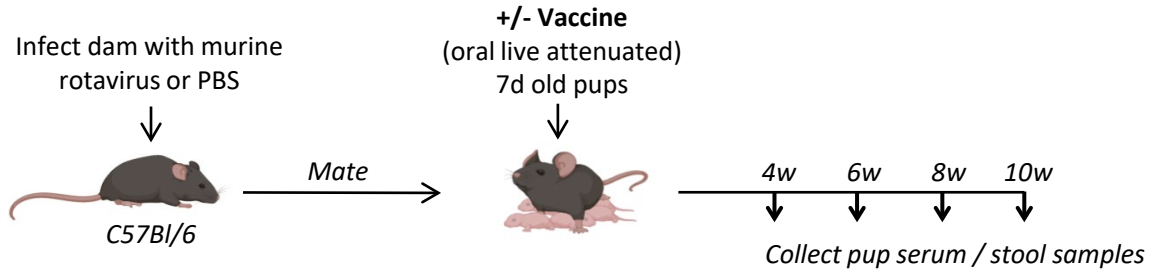
FcγRIIB inhibition



Vaccine clearance



Mouse maternal antibody interference model



Serum IgG

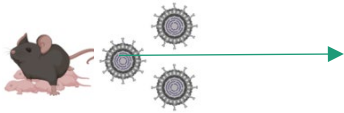
Stool IgA



Sarah Woodyear
Graduate student

Testing Hypothesis 1: Epitope masking

A. Increased vaccine dose



B. Delayed vaccine timing

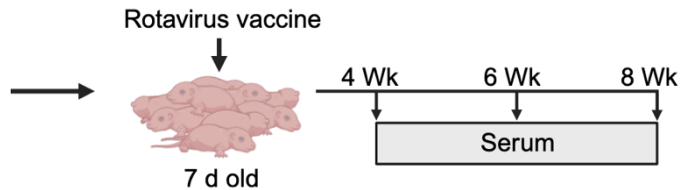
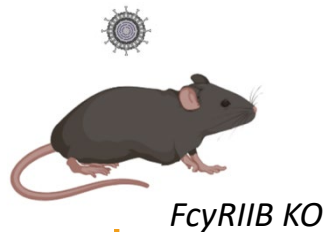


C. Passive transfer of MatAb

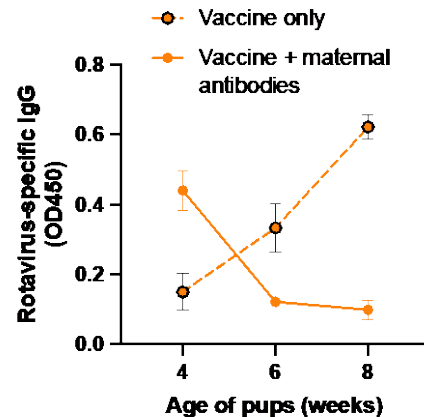
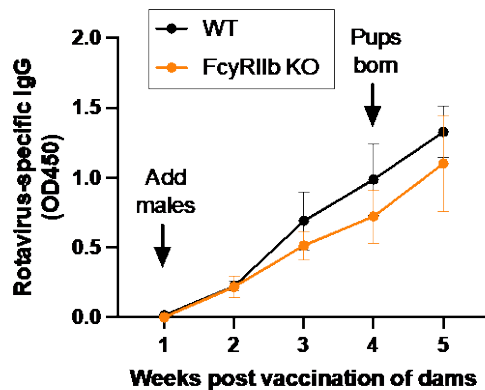


Testing Hypothesis 2: FcγRIIB inhibition

FcγRIIB KO Mice
from Jeff Ravetch



Seroconversion in dams after infection with rotavirus



Testing Hypothesis 3: Vaccine clearance

Vaccine detection in stool by qPCR

Maternal antibody detection in serum

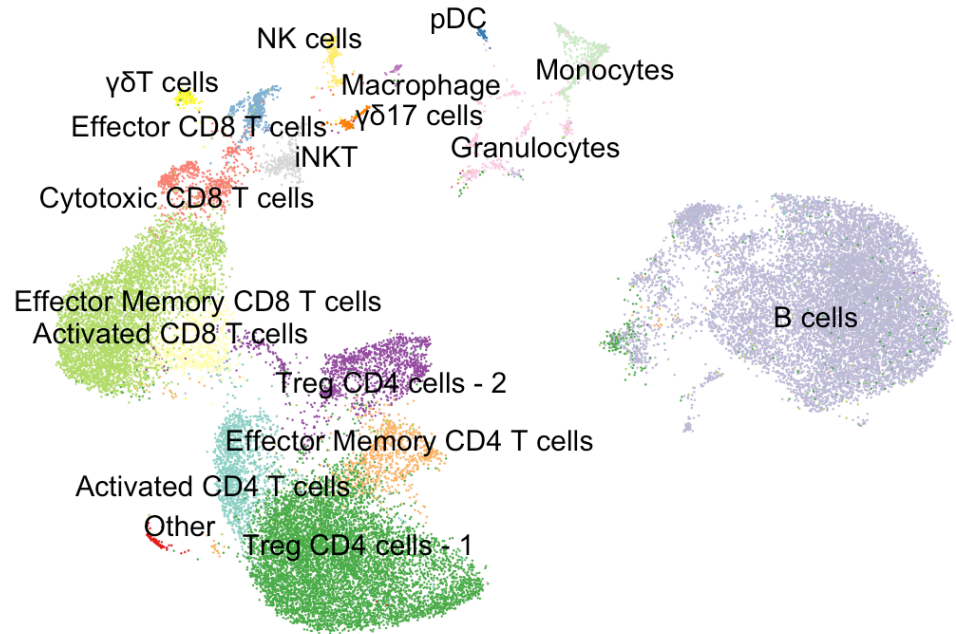
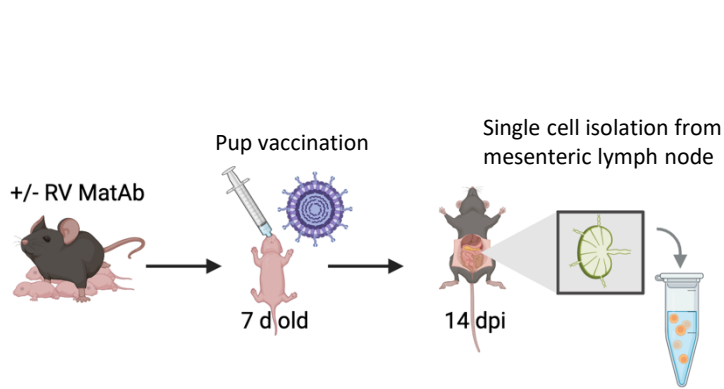
Rotavirus IgG

Total IgG

-> Vaccine does not replicate in presence
of maternal antibodies

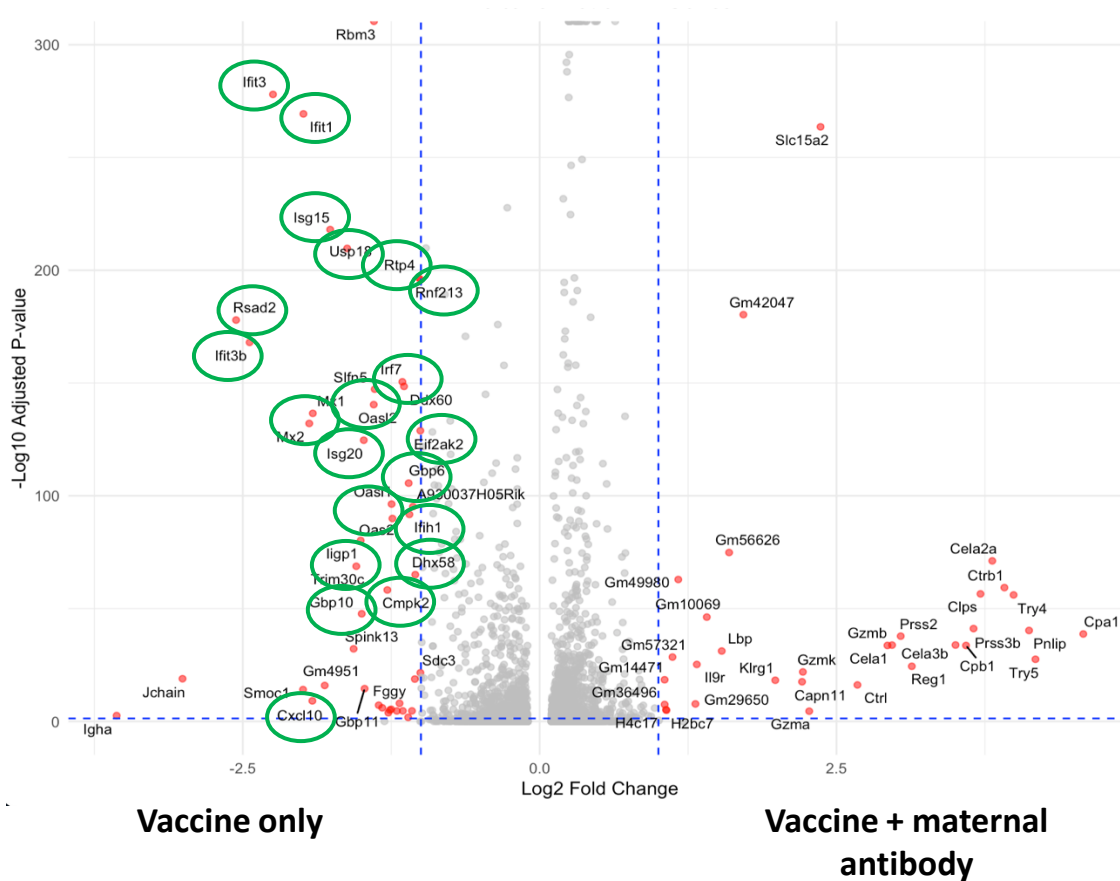
4 weeks old

How do maternal antibodies influence immune responses at the single cell level?



Tawny Chandler

Maternal antibodies dampen the global anti-viral response



Overcoming maternal antibody interference

Double-layered
particle vaccine

Virus shedding
(day 4 post
challenge)

Take home messages



1. What we have learnt so far:

- Maternal antibodies rapidly clear oral rotavirus vaccines
- The infant immune response is simply not induced
- Parenteral vaccine reduces interference by maternal antibodies

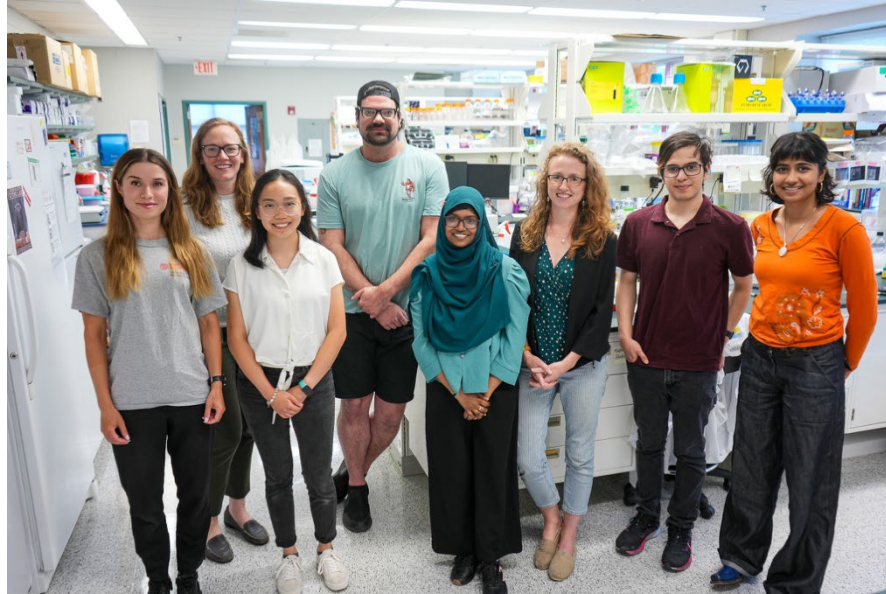
2. Future goals:

- To explore relative roles of breast milk versus placental maternal antibodies

Acknowledgements

Caddy Lab

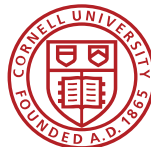
Tawny Chandler
Sarah Woodyear
Tom Lonergan
Serena Teh
Nabila Dewar Binti
Valerie Chen
Yael Specter
Maryam Ahmed
Natalie Baker



Weill Cornell
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