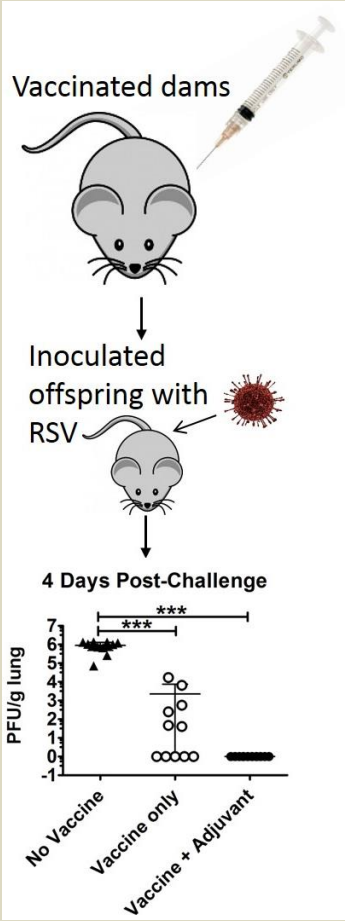
UNIVERSITY OF PITTSBURGH
innovation
INSTITUTE

Maternal Vaccine for RSV in Infants ID: 4429

Featured Innovator: Kerry Empey, PharmD, PhD

Respiratory syncytial virus (RSV) is an extremely common and highly contagious respiratory pathogen, which infects most children before their second birthday. Globally, severe cases of RSV are responsible for about 7 percent of deaths among infants between one month and one year of age. Even in the US, where deaths from RSV are rare, the virus hospitalizes more than 100,000 children and infants each year, and these severe infections during infancy can lead to asthma later on. Past attempts to vaccinate against RSV have been ineffective because of poor antibody production by the infant's immature immune system. Even worse — for reasons that remain unclear — direct infant vaccination with some immunogens heightens the risk of a severe respiratory illness called vaccine-enhanced respiratory disease (VERD). By vaccinating the mother instead, the infant receives her antibodies.



Technology Description

Our novel approach combines an existing vaccine candidate for RSV — which is currently undergoing stage I clinical trials — with an adjuvant to boost antibody formation. This is the first time that this particular immunogen and adjuvant have been used together as an RSV vaccine Critically, this regimen is designed for the mother to receive during pregnancy. We saw that infant mice born to mothers who received our novel RSV vaccine cocktail were less susceptible to RSV infection compared to infant mice born to unvaccinated mothers or infants whose mothers received the vaccine only. The offspring of cocktail-treated mothers were also less likely to develop VERD compared to infant mice whose mothers received only the vaccine immunogen. This vaccine/adjuvant combination has the potential to prevent RSV infection in infants while also mitigating the risk of VERD.

Advantages

- Enhanced viral protection for the infant
- Protection of the mother from RSV infection
- Protection of the infant from RSV infection without the risk of VERD
- The maternal vaccination strategy effectively removes the barriers associated with immature infant immunity and maternal antibody interference

Applications

- Preventing RSV infection in infants

Stage of Development

in vivo data

IP Status

Provisional patent application in prosecution

UNIVERSITY OF PITTSBURGH
innovation
INSTITUTE

Innovator

Kerry Empey, PharmD, PhD

Assistant Professor
Department of Pharmacy and Therapeutics
Center for Clinical Pharmaceutical Sciences
Clinical and Translational Science Institute
Department of Immunology
University of Pittsburgh

As a clinician-scientist, Dr. Empey conducts clinical and translational research aimed at understanding critical immune targets involved in inefficient neonatal host immune responses to pulmonary infections with the primary goal of improving disease outcomes through immune modulating therapies. Current research interests include understanding the role of age-based factors on host immune responses to pulmonary infections that are prominent in the infant and childhood populations.

Education

PharmD
University of Rhode Island

PhD in Clinical Pharmaceutical Sciences
University of Kentucky

Select Publications

- Eichinger KM, Kosanovich JL, Empey KM (2018). Localization of the T-cell response to RSV infection is altered in infant mice. *Pediatric pulmonology*, 53(2), 145-153.
- Eichinger KM, Egaña L, Orend JG, Resetar E, Anderson KB, Patel R, Empey KM (2015). Alveolar macrophages support interferon gamma-mediated viral clearance in RSV-infected neonatal mice. *Respiratory research*, 16(1), 122.
- Kling HM, Nau GJ, Ross TM, Evans TG, Chakraborty K, Empey KM, Flynn JL (2014). Challenges and future in vaccines, drug development, and immunomodulatory therapy. *Annals of the American Thoracic Society*, 11(Supplement 4), S201-S210.
- Empey KM, Orend JG, Peebles Jr RS, Egaña L, Norris KA, Oury TD, Kolls JK (2012). Stimulation of immature lung macrophages with intranasal interferon gamma in a novel neonatal mouse model of respiratory syncytial virus infection. *PLoS One*, 7(7), e40499.
- Empey KM, Peebles Jr RS, Kolls JK (2010). Pharmacologic advances in the treatment and prevention of respiratory syncytial virus. *Clinical Infectious Diseases*, 50(9), 1258-1267.

University of Pittsburgh
Innovation Institute

130 Thackeray Ave
Pittsburgh, PA 15260

innovation.pitt.edu

Contact

Andrew Remes, PhD, CLP
Technology Licensing Manager
412-624-3134
aremes@innovation.pitt.edu