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
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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

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Select Publications


