Plenary Lecture

The Human Immune Response to Respiratory Syncytial Virus Infection and its Role in the Development of Allergic Airway Diseases

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RSV causes severe lower respiratory tract infection (LRTI) in a minority of infants who then have an increased risk of subsequent recurrent wheeze and asthma development. The treatment of RSV infection is supportive and there is as yet no active immunisation against this virus.

My research aims to address the following two questions.

1. Why and through which immune mechanisms does a significant minority of infants develop severe RSV-LRTI while the majority only develop upper respiratory tract infections?
2. Which immune mechanisms explain the increased risk of recurrent wheeze and asthma development following severe RSV-LRTI?

In this lecture I will focus on innate immune mechanisms that result in enhanced inflammatory responses. Specifically, I will present data from in-vitro cultures of human primary bronchial epithelial cells indicating that RSV infection can reduce their immune inhibitory properties. Furthermore, I will present data from a clinical study of infants with severe bronchiolitis which show enhanced pro-inflammatory properties of conventional dendritic cells in very young infants and reduced plasmacytoid dendritic cell responses in older infants suggesting two endotypes of RSV LRTI, one driven by heightened pro-inflammatory responses and the other driven by insufficient anti-viral responses.

Finally, I will go on to discuss potential dendritic cell and epithelial cell mechanisms that could promote allergen-driven, pro-inflammatory, adaptive immune responses, which may explain the increased risk of asthma development following RSV infection.