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## Acute allergic inflammation protects against influenza A virus induced morbidity in mice

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sthma is a debilitating disease of the airways that affects over 200 million people worldwide. The asthma burden in the Apopulation, marked by disability and death, is highest in young and senior adults. Asthma was identified as a major risk factor associated with hospitalization during the 2009 influenza pandemic. However, retrospective analyses noted that asthmatics were less likely to suffer from complications associated with or die from influenza. Reasons for these seemingly counterintuitive findings were unclear. In order to study this effect in the laboratory setting, we aimed to generate a mouse model system of asthma and influenza co-morbidity using an Aspergillus fumigatus-induced mouse model of asthma and A/CA/04/2009 pandemic H1N1 strain of influenza virus. By varying the time of viral infection, we determined that mice infected with pH1N1 during allergic airways inflammation were protected against influenza measured by body weight loss. While early viral replication kinetics was similar between the asthma and flu mice compared to flu-controls, mice with asthma were able to clear virus from the lungs sooner than those without asthma. This clearance correlated with the infiltration of virus-specific CD8+ T cells. Influenza virus is cytopathic especially to the bronchial epithelial cells. We noted that bronchial epithelia of mice in the asthma and influenza groups retained their "healthy" morphology while cells in the flu-control animals were necrotic. Using human bronchial epithelial cells from healthy and asthmatic donors, we determined that in spite of viral replication, epithelial cells from asthmatic donors were resistant to influenza virus induced damage thereby highlighting the clinical relevance of our findings. Ongoing studies are aimed at identifying mechanisms that mediate altered outcomes during influenza in acute inflammation of allergic airways.

## **Biography**

Amali E Samarasinghe completed her PhD in 2010 through a Presidential Fellowship from North Dakota State University in Molecular Pathogenesis under the tutelage of Dr. Jane Schuh. She completed a Postdoctoral fellowship in 2012 under the mentorship of Dr. Jonathan McCullers at St. Jude Children's Research Hospital in Infectious Diseases. She is now a faculty member in the Department of Pediatrics at the University of Tennessee Health Science Center in Memphis and her laboratory focuses on delineating immune pathways of respiratory infections in allergic hosts.

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