European Respiratory Society
Annual Congress 2013

Abstract Number: 2575

Publication Number: 3513

Abstract Group: 3.2. Airway Cell Biology and Immunopathology

Keyword 1: Epigenetics **Keyword 2:** Viruses **Keyword 3:** Epithelial cell

Title: Epigenetic control of antiviral and innate immune response following viral infection in a lung epithelial model

Dr. Mirella Cosma 21190 Spalluto cmsp@soton.ac.uk [1], Dr. Karl J. 21191 Staples K.Staples@soton.ac.uk [1], Mr. Richard 21192 McKendry rtm1g10@soton.ac.uk [1], Dr. Tilman 21193 Sanchez-Elsner T.Sanchez-Elsner@soton.ac.uk [1] and Dr. Tom M.A. 21194 Wilkinson T.Wilkinson@soton.ac.uk MD [1]. [1] Clinical and Experimental Science, Faculty of Medicine, University of Southampton, Southampton, United Kingdom, SO16 6YD .

Body: The immune system is controlled by epigenetic mechanisms that modulate responses over the long term and influence disease processes. The impact of respiratory viral infection on epigenetic controls of innate immunity is not yet understood. We established A549 epithelial cell culture models of acute and chronic Respiratory Syncytial Virus (RSV) infection. We investigated how infection epigenetically modulates the transcription of genes RIG1 involved in antiviral response and TLR4 in innate immune response. The epigenetic analysis was performed using Chromatin Immuno Precipitation (ChIP) with antibodies against histone modifications associated with active promoters: H3K4me3, H3K9ac and RNApolII and repressed promoters: H3K9me3 and H3K27me3. In A549, acute RSV infection induced a 40-fold increase in RIG1 mRNA at 48h that correlated at his promoter with enrichment of H3K9ac, H3K4me3, RNApolII and reduction of H3K9me3. An increase in TLR4 mRNA was associated with enrichment of H3K9ac and H3K9me3, and H3K4me3 and RNApolII reduction.

In A549 persistently infected with RSV for over 8 months, RIG1 was reduced while TLR4 was increased. Preliminary data show a correlation with epigenetic changes at the gene promoters. These findings suggest that acute and chronic viral infection leave epigenetic marks, which may lead to differential and long term influences on key inflammatory and innate responses.