**Introduction**

Circadian variations in immune parameters such as lymphocyte proliferation, antigen presentation and cytokine gene expression have been described. Recently, an association between the molecular circadian clock, immunity and inflammation has been recognised. To date research in this area has focussed on the innate immune response. However, the time at which the lung is exposed to an allergen might significantly affect the ability of the lung to mount an adequate immune response. Furthermore, this line of investigation might provide valuable insight into asthma, a common disease with a strong circadian rhythm.

**Method**

We used a well-defined mouse model of allergic lung inflammation, the ovalbumin challenge model. After initial intraperitoneal sensitisation, 4 groups of C57Bl/6 mice received ovalbumin challenge at one of four time points, repeated at the same time for 3 consecutive days. The timepoints used were: 1 am, 6 am, 1 pm or 6 pm. Measurements of airway hyper-responsiveness were recorded, bronchoalveolar lavage was performed and lungs were harvested for immunohistochemistry and for gene analysis by PCR. Experiments were repeated in clock gene knock-out mice, rev-erbα−/−.

**Results**

- C57Bl/6 mice challenged at 1 am develop increased AHR
- This suggests that allergic airway inflammation is under clock control
- Rev-erbα−/− mice show identical responses, suggesting that REV-ERBA is not critical to the development of airway inflammation in this model
- C57Bl/6 mice challenged at 6 pm develop the most profound inflammatory response within the lung (Figure 1)
- This suggests that allergic inflammation within the lung is caused by a different mechanism to that within the airway, yet is also under clock control

**Discussion**

Understanding the mechanism underlying clock control of allergic lung inflammation and its possible translation to asthma, provides a new therapeutic opportunity. Furthermore, targeting earlier stages in the circadian pathway might narrow the therapeutic window for timing of existing drug delivery, reducing drug dose and minimising side effects by giving shorter acting agents and the most efficacious time of day.