

## Research Award:

# Do fibrous mineral dust particles elicit a pro-fibrotic response in a conditioned medium model of the distal airways?

**Awarded to:** R. Latouche, D. Smart and M. Loxham **Amount:** £7,528

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## Lay summary

Airborne dusts in the Afghan desert have been seen to cause lung disease in soldiers returning from the area, but we know little about their make-up and effect. I previously found that this dust contains significant amounts of a mineral called palygorskite, which is of a fibrous shape similar to asbestos. Palygorskite is not, however, found only in desert dust, but is used in a range of cosmetics and animal products, meaning that there is the potential for widespread exposure among the general population. As such, we need to better understand its potential effects on the airways after inhalation. The AAIR award allowed me to examine the effects of this dust in a model of the airways, constructed using cells from the airway surface, called epithelial cells, and cells called macrophages which patrol the surface of the airways and “eat” particles which we inhale. The aim was to better understand how the presence of dust alters the way in which these two cell types communicate with each other – a process which is important in maintaining healthy airways. I found that the two cell types do not react in the same way, with the macrophages being more susceptible than the epithelial cells to the toxic effects of the dust, but also potentially protected by the presence of the epithelial cells. I also found that these effects were greater using pure palygorskite compared to the whole dust samples, suggesting that the palygorskite is a particular toxic component of desert dust. Finally, I saw that desert dust caused increases in the levels of various molecules released by the two cell types, but that these responses were different when the cells were exposed together, compared to when only one cell type was studied. As a result, we now better understand how desert dust might cause lung disease, and also have developed knowledge and experience of interactions between different lung cells when exposed to such dust.

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## Publications

The research which has been performed as a result of this award will be written up into two papers – one focusing on the mineralogy and chemistry of the desert dust samples used, and another examining the effects of cellular exposure to the minerals. Both will include reference to the AAIR charity award in the Acknowledgements/Funders section. In addition, it will form a key part of my doctoral thesis, which will be submitted to the Faculty in December 2016.