BTS Vacation Scholarship 2024

The Role of Oxidative Stress in the Airway upon Exposure to Fungi

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Fungi and their allergens are present as bioaerosols in the air we breathe, which can lead to lead to respiratory sensitisation as well as exacerbation of allergic airway diseases (ADD). This research aimed to investigate how oxidative stress and the generation of reactive oxygen species (ROS) contributes to adverse health effects upon exposure to fungi in bronchial epithelial cells.

The BTS vacation scholarship program has enabled me to complete an 8-week placement with the UK Health Security Agency Experimental Toxicology research group and has equipped me with invaluable hands-on laboratory experience. I gained extensive experience in both cell culture of 2D monolayer and 3D air-liquid interface (ALI) *in vitro* respiratory models using human airway epithelial cell lines such as; HBEC-3-KT, CALU-3, HuBroBec. My learnt microscopy techniques enabled successful culturing of these cell lines to appropriate confluence. Further to this, I had training on scientific protocol writing and was able to produce professional protocols for the laboratory work undertaken. Our experiments involved exposing ALI models to *Aspergillus fumigatus* and *Alternaria alternata* extracts at both 500ug/ml and 1000ug/ml for 2 hour, 6 hour and 24 hour timepoints. Analysis included both reactive oxygen species (ROS) (H_2O_2/Superoxide dismutase/catalyse) assays, toxicological endpoint investigations such as cytotoxicity (LDH) assays, and gene expression assays (mRNA extraction, cDNA synthesis, primer design, primer validation and qPCR).

Following my placement, I had the opportunity to write a report based on my research undertaken, which will hopefully be implemented in future publications. Furthermore, I had the chance to present my findings in a scientific meeting to a cohort of toxicologists, and will have produce a poster that will be presented at a research training day. This novel experience enhanced my public speaking comfort and enabled me to gain immeasurable knowledge through feedback, which I will carry with me throughout my scientific journey.

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