

College/University PhD Studentship in Microbial Sciences

Studentship Number MBSP-12/02

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Host Department: Department of Genetics

Project Title: Investigation of the Changes in Behaviour of Microbial Commensals and Pathogens in Response to Air Pollution

Project description:

Particulate matter (PM) is the collective name for fine solid or liquid particles added to the atmosphere, either by human activities (primary particles) or atmospheric reaction (secondary particles) involving gases such as sulphur dioxide and nitrogen oxides. It is well established that increased PM in the atmosphere affects human health and results in premature mortality, increased hospital admissions, allergic reactions, lung dysfunction and cardiovascular disease.

There is also evidence of an association between air pollution and respiratory tract infection as epidemiological studies have shown a strong correlation between increased PM and increased hospitalization of children and the elderly with pneumonia. However there is no appreciation of how increasing air pollution directly affects the upper respiratory tract bacteria fundamental to human health. The aim of this project will be to establish how air pollution directly affects commensal and pathogenic bacteria associated with the human respiratory tract.

This project will build on our current research on upper respiratory pathogens (JAM & PWA), bacterial oxidative and metal stress responses (JAM, PWA, JMK) and the analysis of human microbiota (JMK). The proposed project involves a collaborative, cross-Departmental and cross-College, multidisciplinary research strategy that offers an excellent opportunity for a PhD student to work on a new research area. The analysis of the effect of pollutants on the nasopharynx microbiota will involve training in microbiology, molecular genetics, transcriptional analysis, bioinformatics and the use of virulence models. Together the supervisors' groups are well experienced in the techniques required for successful completion of the project. The project will also be supported by the expertise of Prof. Paul S. Monks from the Department of Chemistry who leads a major UK and international air pollution research programme.