**Department of Respiratory Sciences PhD studentship Project information**

**Funding Source: Self-Funded**

**Proposed project start date:** January 2025

**Closing date for applications:** Open ended

**Eligibility:** International

**Department/School:** Respiratory Sciences

**Supervisors:** Professor David Cousins dc282@leicester.ac.uk

**Project Title:** Examining the role of IL18R1 and IL18RAP in asthma

**Project Description:**

**Background**

IL-18 is a proinflammatory cytokine though to be involved in the induction and regulation of Type 1 immune responses (1). It functions by binding to the IL18 receptor which is composed of two proteins, IL-18 receptor 1 (IL18R1) and IL-18 receptor accessory protein (IL18RAP) (2). Both genes are found in a gene cluster on human chromosome 2q that has been associated with asthma in genome wide association studies (3). The precise role of IL18 and its receptor in asthma pathogenesis is unclear.

**Aims**

To investigate expression and function of the IL-18 receptor on immune cell types in peripheral blood samples from asthma and control subjects

**Objectives**

Clone IL18R1 and IL18RAP genes into a lentiviral expression vector containing a fluorescent reporter

Overexpress IL18R1 and IL18RAP in HEK293 cells

Test commercially available antibodies recognizing IL18R1 and IL18RAP by flow cytometry and western blot.

Examine expression of IL18R1 on immune cell types in peripheral blood samples.

Using in vitro assays to examine the effect of IL18 on immune cell function.

Compare effect of IL18 on immune cell function in healthy and asthmatic subjects.

**Experimental plan and techniques to be used**

Molecular Biology including restriction digestion, PCR, DNA sequencing, transfection of mammalian cells

Lentiviral particle production and transduction of primary human immune cells

Advanced multi colour flow cytometry

Real-time quantitative RT-PCR using TaqMan chemistry

Western blotting

**References:**

(1) Sims, J. E. & Smith, D. E. The IL-1 family: regulators of immunity. Nat Rev Immunol 10, 89–102 (2010).

(2) Boraschi, D., Italiani, P., Weil, S. & Martin, M. U. The family of the interleukin-1 receptors. Immunol Rev 281, 197–232 (2018).

(3) Shrine, N. et al. Moderate-to-severe asthma in individuals of European ancestry: a genome-wide association study. The Lancet Respiratory Medicine 7, 20–34 (2019).

**Fee details:** Self-funded international students. No fee waiver available. Fee Band 26 (£38,300)

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**To apply please refer to** [**https://le.ac.uk/study/research-degrees/research-subjects/respiratory-sciences**](https://le.ac.uk/study/research-degrees/research-subjects/respiratory-sciences)