

Principal Investigator

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Summary of research:

Immune Diseases, Allergy, Genetic architecture, Biomarkers

Application Lay Summary:

1a: The aim of the proposed research is to investigate the genetic architecture behind immune diseases and allergies. We will determine interactions between genetic factors, immune disease status and biomarkers known to be involved in inflammation; investigate SNP heritability and genetic overlap between diseases. For this, GWA studies will be carried out for a number of immune diseases.

Results from this study will increase our understanding of immune diseases and allergies and will emphasize the important role of biomarkers. We aim to explore pathways to be identified as therapeutic targets and help identify individuals at highest risk for immunodeficiency and allergy.

1b: The goal of the project is to apply and develop methods to investigate the genetic background of immune diseases and allergies. These methods can be applied to further projects of a similar nature and help develop the UK biobank resource in line with its stated purpose.

1c: Statistical models will be applied to analyze association between genotype and disease status. Linear regression models incorporating relevant covariates will be used for association studies, SNP heritability and genetic overlap studies. For the genome-wide approach, the current available dataset of ~ 150,000 individuals will be used. Validation will be performed in the remaining proportion of the full cohort when available.

1d: We aim to include the full cohort with immune and allergy data, both cases and controls or quantitative when available. We will also need access to inflammatory biomarker data. We will need further variables to be included as

covariates (i.e. sex, age, bmi, length and weight). We aim to use both genotyped data as well as the imputed data.

We will start by looking at self-reported outcomes, and in the next year or two, when hospital episode statistics and primary care will be available, we will further confirm some of the allergies, i.e. food intolerance etc.