

Principal Investigator

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Funding body

Wellcome Trust - the Applicant PI has been awarded a Sir Henry Wellcome
Postdoctoral Fellowship

Summary of research

Autoimmunity, inflammation, causality, methodology, biomarkers

Application Lay Summary:

1a: Many immune-mediated diseases have increased in prevalence over the last century. Environmental risk factors and biomarkers have been proposed to explain this change, but confounding has made demonstrating true causal pathways difficult.

Our aim is to use the large sample size and broad phenotyping and genotyping of the UK BioBank to test causal relationships among putative and novel risk factors for immune-mediated disease, and reconstruct causal pathways from initial risk factor to disease.

We will investigate six common diseases that have undergone genetic study: Crohn's disease, ulcerative colitis, multiple sclerosis, type 1 diabetes, psoriasis and rheumatoid arthritis.

1b: This research is focused on discovering putative causal pathways for immune

diseases. Such pathways may directly allow us to find ways of reducing the risk of disease by modifying the environment, and may also provide useful biomarkers for diagnostic or therapeutic targets.

1c: Over the last decade genome-wide association studies have catalogued genetic risk factors for a wide range of diseases and biomarkers. As these genetic factors are present from birth they can be used as instruments to test hypotheses about causal pathways.

We will use both standard and novel techniques to test for genetic sharing between diseases and risk factors or biomarkers, as well as correlations between phenotypes and disease onset. We will also deploy novel methods developed in our group for investigating causal pathways. These methods consider all genetic and phenotypic information together to reconstruct causal pathways between measured phenotypes.

1d: Full cohort