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Summary of research

Key words: Genetics, Methods, Environment, Lifestyle, GWAS,
Interactions

Application Lay Summary:

1a: This research project aims to develop statistical methods for large-scale genome-wide association studies that include a wide variety of lifestyle factors. We will combine genetic and non-genetic data using three main approaches: we will study whether genetics can predict important lifestyle factors (such as smoking behaviour, diet, exercise, and alcohol consumption); we will test for interactions between genetic and environmental factors; we will study the genetic architecture of quantitative traits (such as obesity-related traits, bone density measures, and red blood cell measures) with increased statistical power.

1b: A major goal of this research is to develop novel statistical methods for analysing large-scale genetic data combined with a large number of lifestyle variables. The methods we develop will allow us and other researchers to use the UK Biobank resource to examine how behavioural traits and gene-environment interactions contribute to medically relevant traits, which will provide insights into human biology and therefore human health.

1c: This research will examine genetic markers for their potential role in explaining a series of traits and lifestyle factors. Specifically, we will develop and apply statistical methods for examining associations between genetic factors and

a wide variety of non-genetic factors, while taking into account the correlations between the non-genetic factors themselves.

1d: Full cohort