Application number/Title: 13399 - Genetic epidemiology of Ménière disease in UK Biobank

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Keywords provided by the Applicant PI to describe the research project:

Menieredisease, GWAS, ear, deafness, vertigo, tinnitus

Application Lay Summary:

1a: The primary aim is to find genes for Ménière disease (MD) by conducting a genome-wide association study (GWAS). Additionally, we shall look for interactions between genetic and environmental risk factors in MD and for genetic overlap between MD and co-morbid conditions.

MD is a disorder of hearing and balance affecting 1/2000 people in the UK. Most cases are sporadic, and the causes of MD probably involve a variety of genetic factors as well as environmental exposures.
The project will be carried out in Glasgow and Exeter, and co-led by a clinical expert in London.

1b: This project meets UK Biobank's stated purpose of improving the prevention, diagnosis and treatment of illnesses by identifying genetic risk factors for

Ménière disease and their relationship with other risk factors. This will lead to better understanding of disease processes in MD, routes to diagnosis, prediction of individuals at increased risk given their genetic make-up and environmental exposures, and new treatment strategies. The project is linked to our previous analyses of UKB data concerning MD epidemiology and brain-related phenotypes (mood, personality, cognition, migraine, biorhythms), anthropometric traits, metabolic disorders, menopause and disorders of the immune system.

1c: We shall use statistical tests to investigate whether there are detectable gene variants that predispose to Ménière disease (MD) in affected individuals in the UK Biobank population sample. If we find evidence for such genes, we shall go on to investigate which MD genes are shared by MD patients from other cohorts, whether any genes predisposing to other disorders are also risk genes for MD, and whether the action of any MD risk genes is influenced by environmental risk factors. These investigations will lay the foundations for a biological approach to the design of new treatments for MD.

1d: This study will include the full genotyped cohort of the UKB database. We require data for all the Ménière disease cases. With access to the full genotyped cohort, we can also carry out the extensive filtering required to a) select a control group that is age-, sex- and ethnicity-matched, b) exclude a wide range of individuals with other ear, balance and headache-related disorders, history of autoimmune disease etc., while c) selecting a group much larger than the case group for enhanced power and d) ensuring a large sample for co-morbidity and shared genetic aetiology analyses.