Principal Investigator

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Summary of research

hearing loss, genetics, vision, cognition

Application Lay Summary:

1a: The aims of this research are:

i) Understand the genetic and environmental causes of age-related hearing loss (ARHL) and tinnitus

ii) Understand interactions between genetic and environmental causes

iii) Identify common genetic or environmental factors associated with ARHL, vision loss and cognitive decline.

ARHL is strongly heritable, but there is limited understanding of the genes associated with ARHL. Declines in hearing, vision and cognition are correlated, suggesting that they share common causal pathways. Recent research suggests that environmental factors (noise, smoking, alcohol consumption) moderate ARHL. Some lifestyle-related factors may interact with genetic factors to increase susceptibility to ARHL.

1b: This research will improve prevention and treatment of age-related hearing loss (ARHL). In the UK in 2011, 10 million people had hearing loss. Hearing loss does not just impact on communication; it is also associated with loneliness and

depression, cognitive decline and reduced physical well-being. With an ageing society, the number of people with hearing loss is increasing, and hearing loss will be in the top 10 disease burdens by 2030. An international report "Evaluation of the Social and Economic Costs of Hearing Impairment" calculated that hearing loss costs Europe €213 billion per year.

1c: We will discover genes involved with ARHL, and identify any overlap with vision and cognition. We will test the idea that genetic factors interact with environmental and lifestyle factors to make people more susceptible to hearing loss. This is done by comparing genetic markers across participants with hearing and lifestyle measures. Data are available in cross section (collected at 1 point in time) as well as longitudinally (3-5 years later). We will be able to test whether factors that are associated with poor hearing in cross section are also associated with decline in hearing over time.

1d: Participants for whom hearing, tinnitus and genome-wide association data are available (Digit triplet test, N=164,770; Self-report hearing, N=502,642; tinnitus, N=171,736)