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## **The UK Biobank project: research opportunities for human health and disease**

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The UK Biobank project is a prospective cohort study with deep genetic and phenotypic data collected on approximately 500,000 individuals from across the United Kingdom, aged between 40 and 69 at recruitment. The resource is open to public for research purposes and is unique in size and scope. The open resource is unique in its size and scope.

A rich variety of phenotypic and health-related information is available on each participant, including biological measurements, lifestyle indicators, biomarkers in blood and urine, and imaging of the body and brain. In addition, follow-up information is provided by linking health and medical records and repetitive assessments for diverse ranges of biologic information have been performed. Most importantly, genome-wide genotype data have been collected on all participants, providing many opportunities for the discovery of new genetic associations and the genetic bases of complex traits. Recently, a large-scale whole-genome and whole-exome sequencing data has been published with the UK Biobank participants, further investigating the deep-level of human genome in relation to health.

The UK Biobank provided numerous opportunities to the global researchers. Wide ranges of observational findings reported new association between exposures and outcomes using the large-scale deep phenotype data with follow-up information. The availability of individual-level population scale genetic and phenotypic data brought enrichment in genetic and genetic-epidemiology studies, expanding the biologic knowledge related to human health and diseases to another level. Unique imaging data and biochemical data enabled research focusing on novel biomarkers and traits. Whole-genome level data is now extending the knowledge for the clinical significance of rare genetic variants, putting together the puzzle of genetics of human disease.

In this lecture, we will discuss about the unique features of UK Biobank, practical points that should be considered before investigating the databases, and research topics available with the data.