

## Brain – Professor Paul Matthews

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Hello, my name is Paul Matthews and I am Professor and Head of the Division of Brain Sciences here at Imperial College University, London. I have been working in brain imaging for more than 30 years.

For the past three years I have worked closely with other imaging experts and colleagues at UK Biobank to ensure we take best advantage of this amazing scanning opportunity that you have heard about. I believe that the imaging will transform our understanding of a wide range of diseases, including dementia and other neurological conditions, heart disease and cancer.

I want to tell you a little about the brain imaging component of the scanning. Including imaging in the UK Biobank will provide scientists with a new resource with which to learn about brain structure, how our brains are built and what they do when we are thinking. Imaging can tell doctors about the early stages of some diseases even many years before they cause symptoms.

With imaging in the UK Biobank, scientists will be better able to discover how brain diseases such as depression, stroke or Alzheimer's disease are affected by our genes, environments and lifestyles. If we better understand this, we can find new opportunities to prevent or better treat the diseases.

MRI scans provide a detailed picture of the brain and its parts. New methods give us some idea of the wiring of the brain - how the different parts, each of which has a different function, connect to each other. And we also can begin to understand what these functions are by making pictures showing the small changes in brain blood flow that accompany our thoughts. All of these kinds of pictures can detect changes with disease. Scientists now want to use these changes to more sensitively identify risk factors for brain disease, especially those that could be changed.



Until now, most brain imaging researchers have been able to study only small numbers of people. This has greatly limited what they could learn. You will be helping UK Biobank to change this. We plan to scan 100,000 people who may have or may or may not go on to develop a wide range of illnesses. Combining information from brain imaging with the other data that we have already collected on participants, as well as data from imaging the heart, abdomen, bones and neck arteries, will be the driving force behind a unique approach to the investigation of the causes of disease.

By 2020, we believe that as many as 2,000 of UK Biobank participants will experience a stroke, 1,000 will develop Parkinson's disease and 2,000 will show signs of Alzheimer's disease among the 100,000. Over subsequent years, numbers will increase. This is just part of normal aging in our population now. If you participate, we will follow your health over many years to help us understand how a large number of interacting factors such as age, gender, lifestyle and genetic information have the potential to influence brain health. This would be a world first.

Imaging in the UK Biobank will build a resource to be used now and long in the future. The imaging data will be saved in the safest and most secure ways that we can find. We will work to extract important information from the data to benefit those researchers not expert in imaging, as well as the experts. Further value will be added as advances in the way that these complex images are analysed in the coming years develops. Much of the development will, in fact, be stimulated by the large amounts of information that UK Biobank will collect. Other health information, including the genetic analysis of blood samples, will add even more power to the resource. Overall, its scale and breadth will be unique.

Thank you for taking the time to watch this video. If you have any questions about the science or about the procedure itself, please do make contact with UK Biobank. You can do this by email or telephone, by following the information on this page. Once again, thank you for your support. We are very grateful to you.