

Largest ever Epigenetics project launched

One of the most ambitious large-scale projects in Human Genetics has been launched today: Epitwin will capture the subtle epigenetic signatures that mark the differences between 5,000 twins on a scale and depth never before attempted, providing key therapeutic targets for the development of drug treatments.

The project is a collaboration between TwinsUK, a leading twin research group based at King's College London, and BGI, one of the world's largest genomic organisations headquartered in Shenzhen, China. Epigenetics is the most cutting edge emerging field in Genetics, which explores how the actions of genes can be temporarily modified by chemical reactions that may occur either at random or by lifestyle or diet. This effect may last several generations.

The plan is to look at the methylation patterns of 20 million sites (called CpG islands) in the DNA of each twin and compare them with the patterns in the co-twin. Rather than looking at similarities as in previous studies, the team will be looking for differences that explain why many identical twins don't develop the same diseases. Initially the team will focus on obesity, diabetes, allergies, heart disease, osteoporosis and longevity, but the method can be applied to every common trait or disease.

'Finding the crucial differences between twins will lead us to the key genes that are being turned on and off, and so to the cause of disease, with great potential to find key targets for drug treatments,' says Tim Spector, Director of TwinsUK and Professor of Genetic Epidemiology at King's College London, who is the co-leader of the project. *'The fact that twins are such a marvellous natural experiment, combined with the hundreds of disease details and traits on the twins that we have collected over 17 years, offer a unique study opportunity. So far this type of study has only been attempted on a handful of twins, so we want to scale it up – one thousand fold.'*

The Executive Director of BGI, who is also the co-leader of the project, Professor Jun Wang, whose team completed the sequencing of many diverse species, including an Asian individual, the Giant Panda, the rice genome, the silkworm genome, and the genomes of the cucumber and ant, is excited about the study: *'Epigenetics is one of our major targets for the next five years – and this combination of our technology and resources with the unique twin resource will provide the world with an unprecedented dataset. We hope to unlock many secrets about human genetics that we don't currently understand, and to accelerate research and applications in human healthcare.'*

The project is expected to cost around £20 million (\$30 million), which are being shared by TwinsUK and BGI.

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Notes to editors

The Department of Twin Research and Genetic Epidemiology at King's College London

King's College London's Department of Twin Research and Genetic Epidemiology (DTR) encompasses the biggest UK adult twin registry of 11,000 twins used to study the genetic and environmental aetiology of age related complex traits and diseases. The DTR has been one of the major departments of King's Division of Genetics and Molecular Medicine since 2006 with a team of over 40 staff.

The Department has a voluntary database of 10,000 identical and non-identical, mostly female, twins from across the UK between the ages of 16 and 85 years – with a mean age of 48. It is now the UK's only adult twin registry and is the most detailed clinical adult register in the world.

DTR has an international track record of research into the genetics of complex diseases with a particular focus on age-related diseases. Its current main focus is the genetics of metabolic syndrome and cardiovascular disease, the musculoskeletal system and ageing as well as research into sight and miscellaneous areas such as skin disease, immunology, gastroenterology and behaviour.

For more information visit www.twinsUK.ac.uk.

BGI

BGI (formerly known as Beijing Genomics Institute) was founded in Beijing on Sept 9th, 1999 with the mission of supporting the development of science and technology, building strong research teams, and promoting the development of scientific partnership in genomics field. With a goal toward excellence, high efficiency, and accuracy, BGI has successfully completed a large number of projects. These include sequencing one per cent of the human genome for the International Human Genome Project, contributing 10 per cent to the International Human HapMap Project, carrying out research to combat SARS, being a key player in the Sino-British Chicken Genome Project, and completely sequencing the rice genome, the silkworm genome, and, most recently, the first Asian diploid genome.

In 2007, in accordance with BGI's goal for developing projects and platforms that are on the cutting edge of research and technologies, the organization's headquarters was relocated to Shenzhen as the first citizen-managed, non-profit research institution in China.

For more information visit www.genomics.cn.