

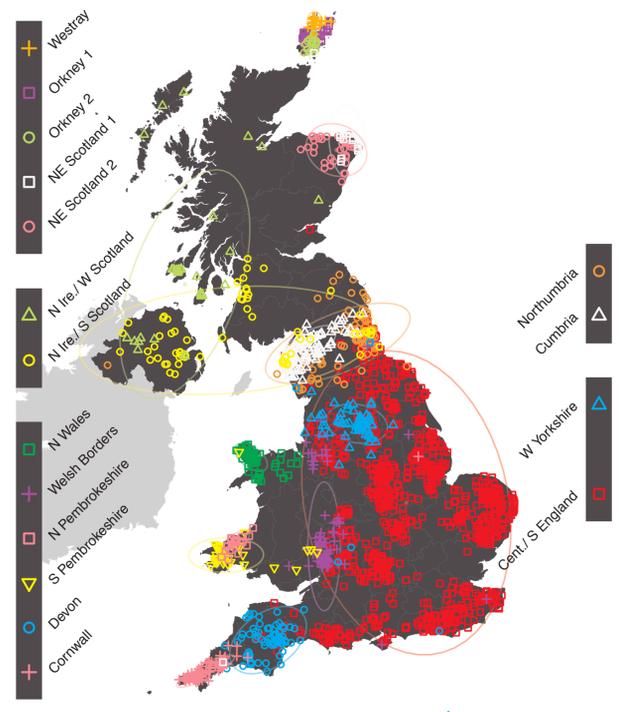
The Wellcome Trust Centre for  
**Human Genetics**

**Fine-scale genetic analysis tracks human populations through history**



A Hazara shepherd on the highlands of Bamiyan province, Afghanistan

The rapid expansion of Genghis Khan's Mongol empire (1206–1368 CE) is one of the most dramatic events in human history. The Hazara from Pakistan are believed to be at least partly descended from these Mongols. Our analysis inferred this population to show the clearest signal of admixture in the entire dataset, with an event occurring 1206–1368 CE, confirming that both the date and origin of the admixture in the Hazara correspond precisely to the Mongol empire



In the British Isles, clusters of genetically similar individuals identified only from DNA separate people from different regions. The regional patterns reflect ancient geopolitical boundaries, and migrations of both the Vikings and the Anglo Saxons into the UK

**WHAT WAS KNOWN**

- The genetic composition of human populations varies throughout the world
- In part, these patterns result from the demographic history of the populations – the migration, invasion, and admixture events, and the degree of isolation affecting the ancestors of modern populations.
- Unravelling the signals of admixture in modern populations could provide insights in to how past events have impacted our DNA
- Understanding variation in populations is also critical to genetic studies of disease

**WHAT WE DID**

- Applied sophisticated fine-scale genetic analysis to 2000 samples from volunteers with grandparents from specific rural areas of the British Isles; and tracked DNA 'chunks' in 95 admixed populations across the world to their likely sources

**WHAT THIS ADDS**

- Reveals for the first time the subtle and striking patterns of genetic differentiation within a country, and the way in which these relate to geography
- Many of the genetic subgroups identified within the UK closely matched geopolitical boundaries from the time after the Anglo-Saxon migrations
- Characterises the genetic legacy of past migrations from Europe into the British Isles and settled a number of outstanding historical controversies
- Shows that it is possible to elucidate the effect of ancient and modern migration events and to provide fine-scale details of the sources involved, the complexity of events, and the timing of mixing of groups by using genetic information alone
- Provides an atlas of worldwide human admixture history, encompassing over 100 events occurring over the past 4000 years, such as the Mongol invasions of Ghengis Khan, and European colonisation of the Americas and of parts of Africa and Asia

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