Population Structure with Genomic Data

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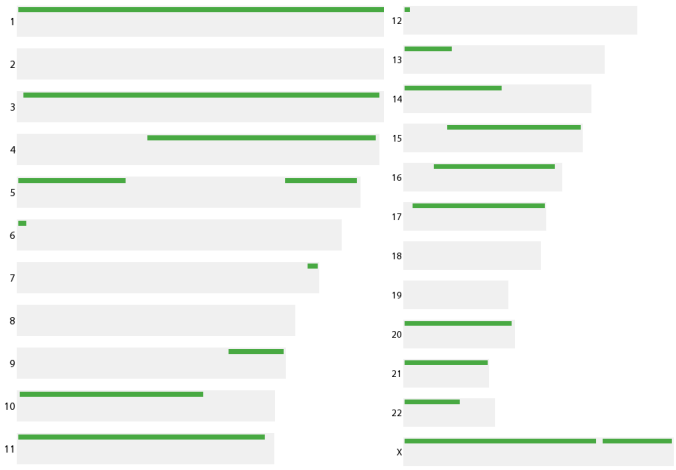
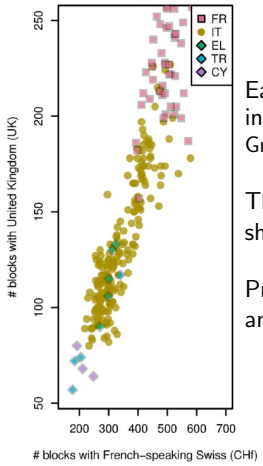
Shared blocks of identity by descent (IBD)

- With molecular data, we can identify shared IBD blocks.
- Close relatives tend to share long blocks.
- Distant relatives share short blocks.

IBD sharing between my mother and daughter



IBD sharing with French-speaking Swiss and UK



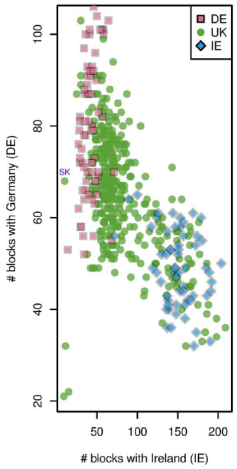
Each dot an individual. Color shows individual's origin. (FR, France; IT, Italy; EL, Greece; TR, Turkey, CY, Cyprus)

Those who share ancestry with Swiss also share ancestry with UK.

Presumably reflects immigration from ancestors of Swiss and British.

Ralph and Coop (2013)

Sharing with Irish and Germans



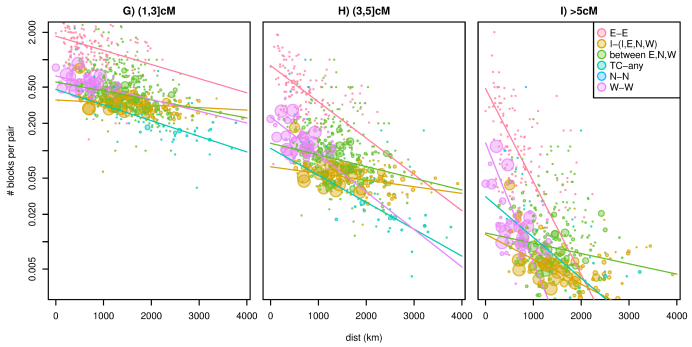
Each dot an individual. Pink, Germans; Green, British; Blue, Irish.

Brits with lots of German ancestry have little Irish ancestry.

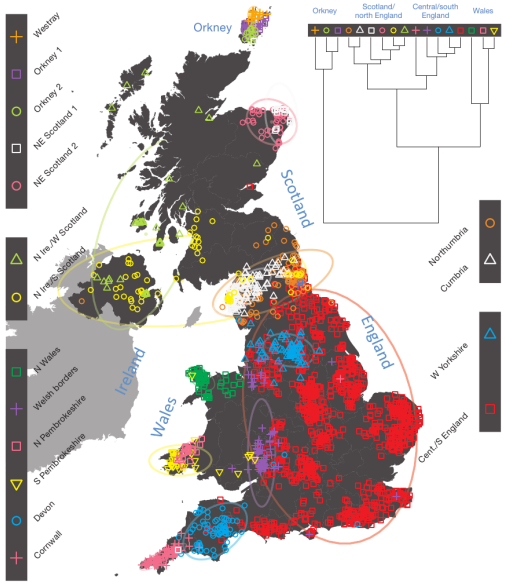
British population is a mixture of Celts and Germans.

If we focused on shorter IBD blocks, we'd be studying a different time scale, and the pattern might be different.

Geographic decay of recent relatedness

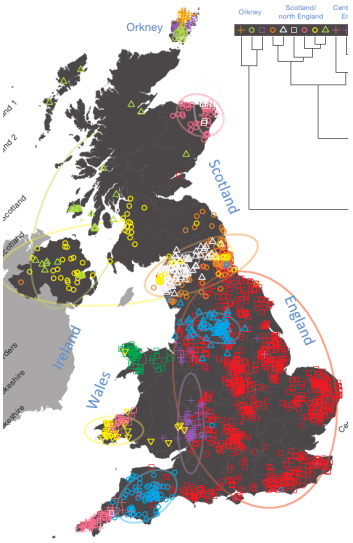


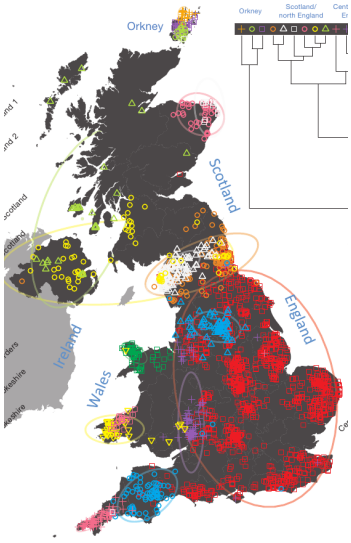
Genetic similarity versus geographic distance. Small dots are pairs of individuals. E, Eastern Europe; W, Western Europe; N, Northern Europe; I, Italy & Iberia; TC, Turkey & Cyprus. (Ralph & Coop 2013)

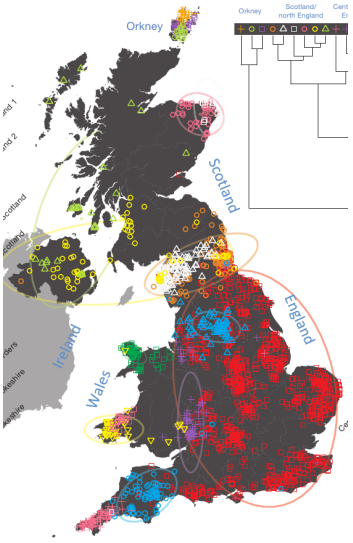


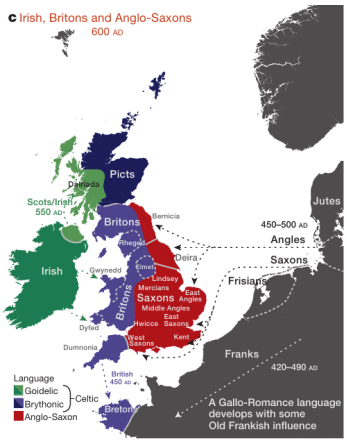
Genetic map of Britain

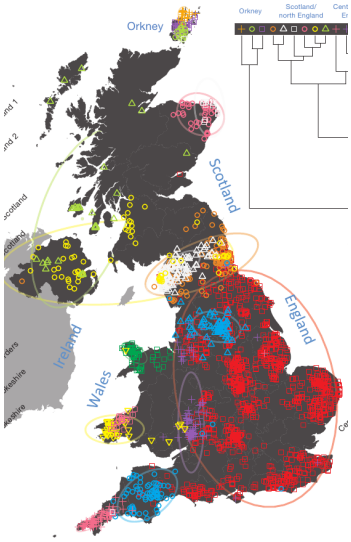
Colors indicate genetically similar groups.

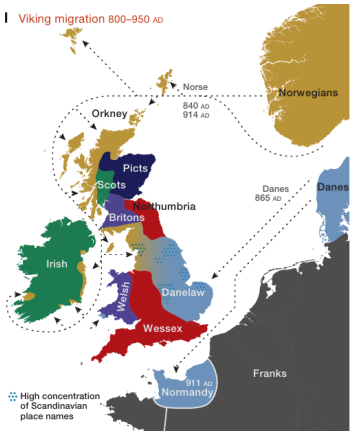












Summary

- By distinguishing between long and short IBD blocks, we can examine geographic population structure on different time scales.