Genghis Khan's genetic legacy has competition

The Mongolian leader left a strong footprint in the Y chromosomes of modern descendants — but he was not the only one.

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A colossal statue of Genghis Khan, warrior and founder of the Mongol empire, outside Ulan Bator.

Millions of men bear the genetic legacy of Genghis Khan, the famously fertile Mongolian ruler who died in 1227. Researchers have now recognized ten other men whose fecundity has left a lasting impression on present-day populations. The team's study[1] points to sociopolitical factors that foster such lineages, but the identities of the men who left their genetic stamp remains unknown.

The case for Genghis Khan's genetic legacy is strong, if circumstantial. A 2003 paper[2] led by Chris Tyler-Smith, an evolutionary geneticist now at the Wellcome Trust Sanger Institute in Hinxton, UK, discovered that 8% of men in 16 populations spanning Asia (and 0.5% of men worldwide) shared nearly identical Y-chromosome sequences. The variation that did exist in their DNA suggested that the lineage began around 1,000 years ago in Mongolia.

Genghis Khan is reputed to have sired hundreds of children. But a Y-chromosome lineage traces a single paternal line in a much larger family tree, and for it to leave a lasting legacy takes multiple generations who fan out over a wide geographical area, says Mark Jobling, a geneticist at the University of Leicester, UK, who led the latest study with geneticist Patricia Balaresque of Paul Sabatier University in Toulouse, France.

"Lots of men have lots of sons, by chance. But what normally doesn't happen is the sons have a high probability of having lots of sons themselves. You have to have a reinforcing effect," says Jobling. Establishment of such successful lineages often depends on social systems that allow powerful men to father children with multitudes of women.

The start of something big

In addition to Genghis Khan and his male descendants, researchers have previously identified the founders of two other highly successful Y-chromosome lineages: one that began in China with Giocangga, a ruler who died in 1582[3] whose lineage was spread by the Qing Dynasty, and another belonging to the medieval Uí Néill dynasty in Ireland[4].

Jobling's team made a systematic search for genetic founders by analysing the Y chromosomes of more than 5,000 men from 127

populations spanning Asia; they focused on that region because lots of data were available and there was already evidence of such lineages. The team identified 11 Y-chromosome sequences that were each shared by more than 20 of the 5,321 genomes. The researchers used DNA differences in the shared sequences, which accumulate over time from random mutations, to determine approximately when the founder of the lineage lived. They tracked back the geographical origins of the lineages by assuming that the founding men had lived in the regions where their genotypes were most prevalent and diverse.

Genghis Khan's paternal lineage again stood out, as did Giocangga's, Jobling's team reports in the *European Journal of Human Genetics*[1]. The other nine lineages originated throughout Asia, from the Middle East to southeast Asia, dating to between 2100 bc and ad 700. Jobling warns that these dates come with huge margins of error, but he notes that the estimates for the lineages attributed to Khan and Giocangga are very close to those of past studies.

Legacy of power

The founders who lived between 2100 bc and 300 bc existed in both sedentary agricultural societies and nomadic cultures in the Middle East, India, southeast Asia and central Asia. Their dates coincide with the emergence of hierarchical, authoritarian societies in Asia during the Bronze Age, such as the Babylonians. Three lineages dating to more recent times were all linked to nomadic groups in northeast China and Mongolia. These included the lineages linked to Genghis Khan and Giocangga, plus a third line dating to around ad 850.

All three lineages seem to have expanded westwards, possibly along the Silk Road trade route. Historians have documented a series of polities based in inner Asia between 200 bc and the eighteenth century, such as the Qing Dynasty. Jobling says that these civilizations could have fostered dominant male lineages after the sons of a fecund founder decamped to satellite outposts, where they, in turn, fathered powerful descendants.

The researchers identify several candidates for the lineage dating to ad 850, but say that more research is needed. Recovering DNA from the candidate or or a long-dead descendant would be the ultimate proof.

"Looking for these links is fascinating. When we did it, we were using pretty indirect lines of reasoning, and you could try and do that with each of these lineages," says Tyler-Smith. "What I really hope is that at some point someone will find Genghis Khan's tomb and remains."

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Corrections

Corrected: The original article indicated that Giocangga was a member of the Qing dynasty. He was in fact a Ming dynasty leader, but his lineage was spread by his descendants in the Qing dynasty. The story has been corrected accordingly.

References

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