To connect the present with the past: The genetics behind our ancestry revealed by the human Y-chromosome

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Abstract

Surname patrilineages come to an end when the offspring is not male, as a result of which rare surnames are disappearing. In many societies, the transmission of surnames is linked with the biological inheritance of the male-specific Y-chromosome (chrY), from father to son. ChrY is a powerful tool for genetic-genealogy as it is the only part of our DNA that is inherited in a conserved manner across generations, providing a strong link between genetic information and a family tree. Two type of chrY changes are interesting to observe variation between men on different time scales: slow mutating single nucleotide polymorphisms (Y-SNPs) and rapid mutating short tandem repeats (Y-STRs). While Y-SNPs indicate far evolutionary ancestry, Y-STRs can identify close paternal relationships. But, as an extensive chrY analysis tool did not exist, it is rarely included in research and not often linked to genealogical, historical-demographic or life science databases. Last year, we developed the CSYseq, which is the first extensive chrY sequencing tool to provide a large dataset of 15,611 evolutionary Y-SNPs and 202 familial Y-STRs. With the CSYseq, we want to connect the present with the past and reveal the genetics behind historical socio-demography in Flanders. We will sequence 450 males with their genealogy linked to the socio-demographical COR* database, which contains representative data for the Flemish population. Combining chrY-surname analysis with genealogical background data will reveal hidden information of our ancestors. First, we will explore surname founder history to gather more perceptions on surname origins and founding fathers. Second, we will unravel offspring gender ratios to know why some families have more sons than daughters. The key deliverable will be a detailed genetic-genealogical database, linking universally exchangeable chrY data with extensive socio-demographic data. Overall, this pioneer study increases the importance of the highly underused chrY for interdisciplinary population research worldwide.

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