

THE SEARCH FOR AN mtDNA REFERENCE FOR ABRAHAM LINCOLN – WHO WAS NANCY HANKS?

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It has been proposed that Abraham Lincoln suffered from one or more genetic disorders, including spinocerebellar ataxia, Marfan's syndrome, and the rare cancer MEN2B. However only recently have ancient DNA analysis techniques become available that could confirm these suspicions that until now have been based on Lincoln's physical appearance and historical reports on the condition of his health.

A number of Lincoln assassination relics exist from which a sample of the President's genome might be obtained for analysis; however, they must first be authenticated through the mitochondrial DNA (mtDNA) obtained from maternally-linked family members. This has proved challenging. Lincoln has no living descendants, his brother and his sister died without issue, and the parents and siblings of his mother Nancy Hanks are unknown.

Two possible candidates for Nancy Hanks' mother are Sarah Harper, wife of Abraham Hanks of Virginia, and Lucy Hanks, who lived in Mercer Co. KY at the same time the President's mother lived there and who later married Henry Sparrow. Since Nancy Hanks' line is extinct, mtDNA samples were collected from the descendants of one other daughter of Sarah Harper Hanks and two other daughters of Lucy Hanks Sparrow. These samples were compared to the mtDNA obtained from two Lincoln assassination relics.

The mtDNA signatures of the maternally-linked Harper-Hanks and Hanks-Sparrow descendants were found to be identical, indicating a maternal link between the candidates, and making it impossible to distinguish the two Nancy Hanks' through mtDNA. Furthermore, the mtDNA profile did not match the mtDNA obtained from either of the two relics. This can likely be attributed to the high level of contamination that the relics have experienced over the last 150 years.

The genealogy of the Hanks family is very incomplete, but not incompatible with the existence of a large maternally linked group within the historical community to which the President's mother belonged. The rarity of the X1c mtDNA haplogroup observed for the group will help identify additional maternally-linked family members whose genealogies may help build a more comprehensive family history and indicate where the President's mother fits into the structure.

We plan to use next generation sequencing on a greater number of relics to try to detect authentic Lincoln DNA beneath the contamination. Although it may not be possible to conclusively determine the genealogy of the President's mother, the detection on the relics of mtDNA belonging to the rare X1c haplogroup would greatly support the provenance of the relics, and enable future testing of the DNA on the relics to determine whether Abraham Lincoln suffered from genetic disorders.