

# Rewriting Greenland's immigration history

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The first immigrants in Greenland were not Indians from the North American continent or Canadian Inuit as previously suggested. And it is not just a question of revising the Greenlandic immigration history. The discovery is the world's first successful attempt to sequence an entire mitochondrial genome from an extinct human.

Thirty-six-year-old Professor Eske Willerslev, University of Copenhagen, and his team of fossil DNA researchers have done it a couple of times before: rewritten world history. Most recently two months ago when he and his team discovered that the ancestors of the North American Indians were the first people to populate America, and that they came to the country more than 1,000 years earlier than originally assumed. And the evidence is, so to speak, quite tangible: DNA samples of fossilised human faeces found in deep caves in southern Oregon.

This time, focus is on Greenland, and the scientific evidence is DNA analyses of hair from the Disco Bay ice fjord area in north-west Greenland, which are well-preserved after 4,000 years in permafrost soil. The team's discovery makes it necessary to review Greenland's immigration history. Until now, science regarded it as a possibility that the earliest people in Greenland were direct ancestors of the present-day Greenlandic population.

It now turns out that the original immigrants on the maternal side, which is reflected in the mitochondrial DNA, instead came from a Siberian population whose closest present-day descendants come from the Aleutian Islands on the boundary between the Northern Pacific Ocean and the Bering Sea and the Seriniki Yuit in north-east Siberia. Discovered in more recent times by the Dane Vitus Bering in 1741, the Aleutian Islands today include some 300 islands spanning 1,900 km from Alaska in the USA to the Kamchatka peninsula in Russia.

"They must have crossed the ice from the Aleutian Islands via Alaska and Canada and then on to

Greenland. We have always known that the first immigrants came to Greenland approx. 4,500 years ago, because tools from that time have been found. But what we did not know was that they probably came via the Aleutian Islands, which our DNA research now shows. The project was actually close to being shelved. Originally, I was in the most northern part of Greenland with Claus Andreassen from the National Museum of Greenland, Nuuk, looking for DNA traces. It was a total failure. But in another context, I found out that archaeologist Bjarne Grønnow from the National Museum of Denmark, Copenhagen, had made some excavations at the Qeqertasussuk settlement in the northern part of West Greenland in the 1980s. And then, among all the samples taken from the frozen culture layers on the site, I suddenly found a tuft of hair which I analysed together with my colleague Tom Gilbert," says Eske Willerslev.

'The forgotten Greenlandic hair' from the samples was subsequently analysed for so-called mitochondria. They are the genes on the maternal side, a kind of cellular power plant, and they are well-suited for comparative DNA studies of mammals, including humans. The Willerslev team then checked the results of the analysis of the Greenlandic hair against an international DNA database and the database came up with the eastern part of Siberia and the Aleutian Islands, which is populated by a group that has peopled other places in the Arctic area.

Another interesting finding is that there is no connection between this DNA mass and the most recent immigration to Greenland, the Thule culture, the ancestors of modern Greenlandic Inuit.

"Our findings prove that humans moved to other places far earlier than what is normally assumed today. We may only have studied the mitochondria – the female part, but it is the first time ever that someone has succeeded in sequencing the entire mitochondrial genome from an extinct human. Our next project will be to raise funds for recreating what is technically known as the core genome from

the tuft of hair, in other words the first full picture of the genetic material of an extinct human.

Today, this is technically possible, and it may tell us where the paternal line came from in the earliest immigration to Greenland, and, for example, the eye colour of these early people. The paternal line may very well come from a totally different place," says Eske Willerslev, who will shortly publish his autobiographical book 'Fra pelsjæger til professor – en personlig rejse gennem fortidens dna-mysterier' (From fur hunter to professor – a personal journey through the DNA mysteries of the past).

Source: University of Copenhagen

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