

STRICTLY EMBARGOED UNTIL
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New Indigenous genome study rewrites the history books

An international team of scientists, including researchers from Murdoch University, have just published findings that re-interpret the history of our species.

The paper appears in this week's edition of the international journal *Science*.

The team pieced together an individual's entire DNA code (or genome) from a hair sample donated by a West Australian Aboriginal man around a hundred years ago.

By sequencing the genome, the researchers demonstrate that Aboriginal Australians descend directly from an early human expansion into Asia that took place some 70,000 years ago, at least 24,000 years before the population movements that gave rise to present-day Europeans and Asians.

The results imply that modern day Aboriginal Australians are in fact the direct descendants of the first people who arrived in Australia as early as 50,000 years ago.

The study derived from a lock of hair donated to a British anthropologist by an Aboriginal man from the Goldfields region of Western Australia in the early 20th century.

One hundred years later, researchers have isolated DNA from this same hair, using it to explore the genetics of the first Australians and to provide insights into how humans first dispersed across the globe.

The genome, shown to have no genetic input from modern European Australians, reveals that the ancestors of the Aboriginal man separated from the ancestors of other human populations some 64-75,000 years ago.

Aboriginal Australians therefore descend directly from the earliest modern explorers, people who migrated into Asia before finally reaching Australia about 50,000 years ago.

In showing this, the study establishes Aboriginal Australians as the population with the longest association with the land on which they live today.

The history of Aboriginal Australians plays a key role in understanding the dispersal of the first humans to leave Africa.

Archaeological evidence establishes modern human presence in Australia about 50,000 years ago, but this study re-writes the story of their journey there.

Previously, the most widely accepted theory was that all modern humans derive from a single out-of-Africa migration wave into Europe, Asia, and Australia.

In that model, the first Australians would have branched off from an Asian population, already separated from the ancestors of Europeans.

However, this study shows that when ancestral Aboriginal Australians began their private journey, the ancestors of Asians and Europeans had not yet differentiated from each other.

Senior author Professor Eske Willerslev from the University of Copenhagen said Aboriginal Australians effectively descended from the first human explorers.

“While the ancestors of Europeans and Asians were sitting somewhere in Africa or the Middle East, yet to explore their world further, the ancestors of Aboriginal Australians spread rapidly; the first modern humans traversing unknown territory in Asia and finally crossing the sea into Australia,” Professor Willerslev said.

“It was a truly amazing journey that must have demanded exceptional survival skills and bravery.”

Murdoch University’s ancient DNA expert Dr Michael Bunce and hair analysis expert Silvana Tridico both contributed to the project.

“It really is remarkable the recent advances in technology that now enable us to convert an old lock of hair into a complete genome – the information encoded in the DNA can tell us a lot about how humans explored the globe,” Dr Bunce said.

“The great news is that there is so much more we can discover both from this sample, and if more research is undertaken; watch this space!”

According to Ms Tridico, the sample not only yielded information on the donor’s ancestry, but also his own personal history.

“I’m used to looking at human hair in forensic case work so it was a refreshing change to look down the microscope at a culturally significant historical sample, where I was able to see features like ochre still attached to the hair shafts and weathering from the harsh outback conditions,” Ms Tridico said.

This research was undertaken with the full endorsement of the Goldfields Land and Sea Council, the organisation that represents the Aboriginal traditional owners for the region.

The study has wide implications for understanding of how our human ancestors moved across the globe.

So far the only ancient human genomes have been obtained from hair preserved under frozen conditions.

The researchers have now shown that hair preserved in much less ideal conditions can be used for genome sequencing without risk of modern human contamination that is typical in ancient bones and teeth.

Through analysis of museum collections, and in collaboration with descendant groups, researchers can now study the genetic history of many indigenous populations worldwide, even where groups have recently moved around or intermingled.



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Co-authors of the paper together with representatives of the Aboriginal traditional owners (for the region where the hair originated) will present their findings and be available for comment at a **media briefing** at Murdoch University's Senate conference room on **Friday September 23 at 9am.**

Professor Eske Willerslev (University of Copenhagen, Denmark) ,
Dr Michael Bunce (Murdoch University)
Ms Silvana Tridico (Murdoch University)
Dr Joe Dortch (University of Western Australia)
Dr Craig Muller (Goldfields Land and Sea Council)
Professor David Lambert (Griffith University)

Professor Willerslev will also be presenting the data for the first time in a seminar:

Aboriginal Australians - The First Human Explorers

Seminar Time: 2:30 pm, Friday the 23rd September.

Seminar Location: The Kim Beazley Lecture Theatre, Bush Court, Murdoch University, South Street Campus.

Images available for media:

Please go to <http://www.eurekalert.org/jrnls/sci/> or contact SciPak (scipak@aaas.org) for a copy of the paper and embargo rules as well as high-resolution images to include.

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