DNA may reconnect Aboriginal Australian remains with modern communities

Enlarge / Norman Tindale, pictured here in 1927 with members of a local Aboriginal group, led a mission to gather precise ethnographic and geographic data from many different Aboriginal groups. He also gathered hair from the people he interviewed, which provided DNA samples for earlier studies. The group here is at Rockshelter at Bathurst Head (Thartali) in eastern Cape York Peninsula.
Photo by Herbert Hale, via South Australian Museum Archives Norman Tindale Collection

reader comments

35 with 16 posters participating

Share this story

Since they arrived in Australia in 1788, Europeans have gathered the remains of Aboriginal Australians for museum and research collections, digging up graves ranging from relatively recent in age to 1,500 years old. Aboriginal Australian communities have lobbied long and hard for the return of their ancestors, and many Australian museums have in recent years made a concerted effort to repatriate Aboriginal Australian remains.

Before the dead can return home, the living must figure out where “home” originally was. Most of the remains unearthed earlier in Australia’s colonial history arrived in museum collections with no record of where they came from or which group they once belonged to. A new study suggests that DNA

sequencing may be able to help the bones of the Aboriginal Australian dead speak for themselves.

Evolutionary biologist Joanne Wright of Griffith University and her colleagues sequenced DNA from 10 Aboriginal Australians who lived before European contact, some as long as 1,540 years ago. While these were among the rare cases where museum curators know the remains' origin, the researchers wanted to know whether they could find the closest living relatives of these ancient people. Consistently, the ancient genomes most closely matched those of Aboriginal people now living in the same region where the ancient remains had once been buried. In other words, DNA linked the ancient remains to modern communities that still live in the same place, sometimes over a thousand years later. And that could help with efforts to repatriate Aboriginal Australian remains that museums haven't been able to trace.

Ancient DNA in a harsh environment

It's the first time scientists have sequenced genomes from ancient human remains in Australia. DNA breaks down over time, and it can be difficult to find and piece together enough fragments of DNA from an ancient skeleton to learn much about it. "This degradation process increases in the presence of water, heat, and UV light…all things that Australia has an abundance of," Wright told Ars Technica. "DNA degrades a lot faster and where it might be possible to extract DNA from a 20,000 year old sample in Europe, it would be hard, if not impossible, to extract DNA of that age in an Australian context."

Previous studies had extracted mitochondrial DNA, a short, circular piece of DNA present in many copies inside each cell and passed directly from mother to child. This is the first time scientists have sequenced full genomes of DNA from the cell's nucleus. Wright and her colleagues used new methods to

extract the DNA from ancient samples of bone and even hair and then used chemical “bait” that specifically targets DNA to help pull usable bits out of a badly degraded sample.

“Genomic techniques and technology have advanced considerably in the last few years, and we have found that we can more efficiently extract ancient DNA now,” Wright told Ars.

Mitochondrial DNA turned out to be less helpful in matching ancient Aboriginal Australian remains to modern communities. Some Australian mitochondrial lineages are confined to specific regions of Australia, while others are spread out across the continent, thanks to how indigenous women moved around in Australia’s distant past. The result is that, if you used mitochondrial DNA to repatriate ancient remains, they would be sent to the wrong community about seven percent of the time.

It’s not always simple—but sometimes it is

Of course, knowing that this process will work doesn’t mean museums will start genomic sequencing and repatriating all of their human remains collections tomorrow. “The next step would be discussion between the stakeholders, i.e. Aboriginal Australians and museums. The decision must be theirs to make. The Aboriginal Australian communities we have partnered with are open to the work being completed. However, not everyone will share that sentiment,” Wright said. “The work is costly, and funding it is something that will need to be negotiated with those capable of assisting, i.e. governments.” In the meantime, Wright and her colleagues are working with museums and Aboriginal Australian communities to build a larger collection of DNA samples with which they can compare ancient DNA.

Genomic sequencing has already helped repatriate human remains

elsewhere in the world. In 1996, the 9,000-year-old skeleton of an early North American man washed out of a muddy bank of the Columbia River near Kennewick, Washington, and into 20 years of controversy. US law says that human remains affiliated with an indigenous American tribe must be returned to that tribe, but anthropologists insisted that the Kennewick Man's features looked more like those of modern Southeast Asian people and that he therefore wasn't related to any modern indigenous American tribe—which meant that his remains wouldn't be reburied. Several tribes, including the Umatilla tribe of the Northwestern US, disagreed.

In 2015, a genomic study linked the Kennewick Man's ancestry to that of the modern tribes who live in the Columbia River Basin, including the Umatilla, the Confederated Tribes of the Colville Reservation, and others. His remains were returned to them and reburied in 2016.

Genomic sequencing helped in the case of Kennewick Man and may help repatriate Aboriginal Australian remains, because the groups involved hadn't moved much or mingled heavily with other ancestries. But that's not always the case, and migration or lots of genetic mixing might make it harder to find a clear match between ancient remains and modern people. "It worked so well with Aboriginal Australians because of the long-term population stability. For it to work with other Indigenous groups it would depend very much on how much migration occurred, kinship and marriage rituals, etc.," Wright said. "It's hard to know without trying it."

Science Advances, 2018. DOI: 10.1126/sciadv.aau5064;(About DOIs).

https://arstechnica.com/?p=1432737