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DNA shows links to PNG peoples, ice age change; Aboriginal origins

Pallavi Singhal
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Aboriginal Australians have the closest genetic links to highland Papua New Guinea populations, the largest DNA study of its kind has found, providing new insights into the movement of early humans following their dispersal from Africa.

The study also found that the last ice age led to more genetic differences between Aboriginal populations in eastern and western Australia than between the indigenous populations of North America and Siberia. "We've tried to reconstruct this genetic map of Australia that tells a story of how dynamic Aboriginal society was over 50,000 years," said Michael Westaway, senior research fellow at Griffith University and co-author of the study, published in *Nature*.

The researchers behind the study sequenced the genomes of 83 Aboriginal Australians from across the mainland, representing a range of geographical and linguistic groups, and 25 people from the highlands of Papua New Guinea.

The findings reveal that Aboriginal Australians and Papua New Guineans split off from Eurasian populations between 51,000 and 72,000 years ago, and occupied a landmass known as Sahul that comprised present-day Australia, Tasmania and New Guinea.

The two groups then diversified between 25,000 and 40,000 years ago, with evidence of a single founding population in Australia linked to the Pama-Nyungan language family that is common to 90 per cent of mainland Aboriginal populations and encompasses two-thirds of the 250 distinct languages spoken at the time of European contact.

The evolution of the Pama-Nyungan language group correlates "almost perfectly" to the evolutionary relationships between the different genomic groups sampled in the study, Dr Westaway said.

According to the study, the evolution of the language reflects the complex movements of populations across Australia, with the initial divergence in the founding group between 10,000 to 32,000 years ago including localised population expansions in north-east Australia and gradual movement to the south west, with subsequent limited gene flow between the geographically distant populations.

Genetic differences between Aboriginal populations were also exacerbated by the last ice age, which occurred about 20,000 to 30,000 years ago. "The continent dried out and the arid core of Australia expanded, creating a barrier to gene flow," Dr Westaway said.

The resulting genetic differences within Australia are greater than those between other geographically diverse populations that share a common ancestry, such as indigenous North American and Siberian peoples.

Australia's single founding population gives it "one of the longest histories of continuous human occupation outside Africa", according to the study, and Aboriginal Australians are linked to some of the earliest evidence of modern human behaviour.

Dr Westaway said: "The earliest evidence of cremation is in a place called Lake Mungo [in western NSW] and the earliest evidence of ground-edge axes is in Australia.

"The shortest sea crossing at the time of that early migration was 120 kilometres. To build a sea craft and plan a journey ... no one else was doing this 50,000 years ago."