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New Research Confirms 'Out Of Africa' Theory Of Human Evolution

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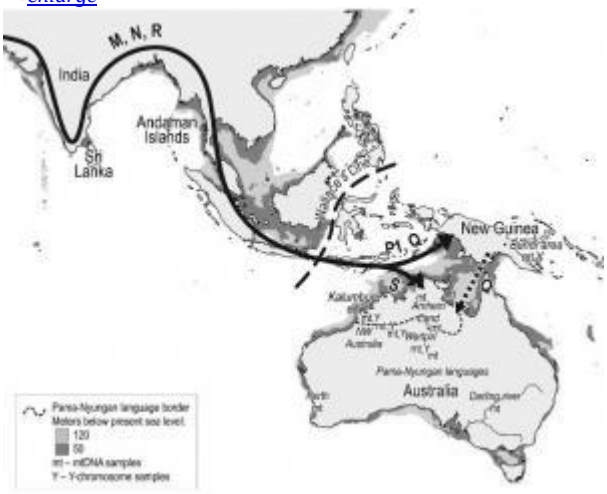

Homo sapiens originated in Africa 150,000 years ago and began to migrate 55,000 to 60,000 years ago. It is thought he arrived in Australia around 45,000 years before present (BP). Australia was, at the time, already colonised by homo erectus. This dispersal, from Africa to Australia through Arabia, Asia and the Malay peninsula, could have occurred at a rate of 1km per year. (Credit: Image courtesy of University Of Cambridge)

May 10, 2007 — Researchers have produced new DNA evidence that almost certainly confirms the theory that all modern humans have a common ancestry. The genetic survey, produced by a collaborative team led by scholars at Cambridge and Anglia Ruskin Universities, shows that Australia's aboriginal population sprang from the same tiny group of colonists, along with their New Guinean neighbours.

The research confirms the “Out Of Africa” hypothesis that all modern humans stem from a single group of Homo sapiens who emigrated from Africa 2,000 generations ago and spread throughout Eurasia over thousands of years. These settlers replaced other early humans (such as Neanderthals), rather than interbreeding with them.

Academics analysed the mitochondrial DNA (mtDNA) and Y chromosome DNA of Aboriginal Australians and Melanesians from New Guinea. This data was compared with the various DNA patterns associated with early humans. The research was an international effort, with researchers from Tartu in Estonia, Oxford, and Stanford in California all contributing key data and expertise.

The results showed that both the Aborigines and Melanesians share the genetic features that have been linked to the exodus of modern humans from Africa 50,000 years ago.

Until now, one of the main reasons for doubting the "Out Of Africa" theory was the existence of inconsistent evidence in Australia. The skeletal and tool remains that have been found there are strikingly different from those elsewhere on the "coastal expressway" – the route through South Asia taken by the early settlers.

Some scholars argue that these discrepancies exist either because the early colonists interbred with the local Homo erectus population, or because there was a subsequent, secondary migration from Africa. Both explanations would undermine the theory of a single, common origin for modern-day humans.

But in the latest research there was no evidence of a genetic inheritance from Homo erectus, indicating that the settlers did not mix and that these people therefore share the same direct ancestry as the other Eurasian peoples.

Geneticist Dr Peter Forster, who led the research, said: "Although it has been speculated that the populations of Australia and New Guinea came from the same ancestors, the fossil record differs so significantly it has been difficult to prove. For the first time, this evidence gives us a genetic link showing that the Australian Aboriginal and New Guinean populations are descended directly from the same specific group of people who emerged from the African migration."

At the time of the migration, 50,000 years ago, Australia and New Guinea were joined by a land bridge and the region was also only separated from the main Eurasian land mass by narrow straits such as Wallace's Line in Indonesia. The land bridge was submerged about 8,000 years ago.

The new study also explains why the fossil and archaeological record in Australia is so different to that found elsewhere even though the genetic record shows no evidence of interbreeding with Homo erectus, and indicates a single Palaeolithic colonisation event.

The DNA patterns of the Australian and Melanesian populations show that the population evolved in relative isolation. The two groups also share certain genetic characteristics that are not found beyond Melanesia. This would suggest that there was very little gene flow into Australia after the original migration.

Dr Toomas Kivisild, from the Cambridge University Department of Biological Anthropology, who co-authored the report, said: "The evidence points to relative isolation after the initial arrival, which would mean any significant developments in skeletal form and tool use were not influenced by outside sources.

"There was probably a minor secondary gene flow into Australia while the land bridge from New Guinea was still open, but once it was submerged the population was apparently isolated for thousands of years. The differences in the archaeological record are probably the result of this, rather than any secondary migration or interbreeding."

The study is reported in the new issue of Proceedings of the National Academy of Sciences.

Related Information

Australia's archaeological record provides several apparent inconsistencies with the “Out Of Africa” theory. In particular, the earliest known Australian skeletons, from Lake Mungo, are relatively slender and gracile in form, whereas younger skeletal finds are much more robust. This robustness, which remains, for example, in the brow ridge structure of modern Aborigines, would suggest either interbreeding between homo sapiens and homo erectus or multiple migrations into Australia, followed by interbreeding.

The archaeological data also indicates an intensification of the density and complexity of different stone tools in Australia during the Holocene period (beginning around 10,000 years BP), in particular the emergence of backed-blade stone technology. The first dingos arrived at around the same time, and it is thought both were brought to the continent by new human arrivals – leading to theories of a secondary migration that has resulted in disputes regarding the single point of origin theory.
