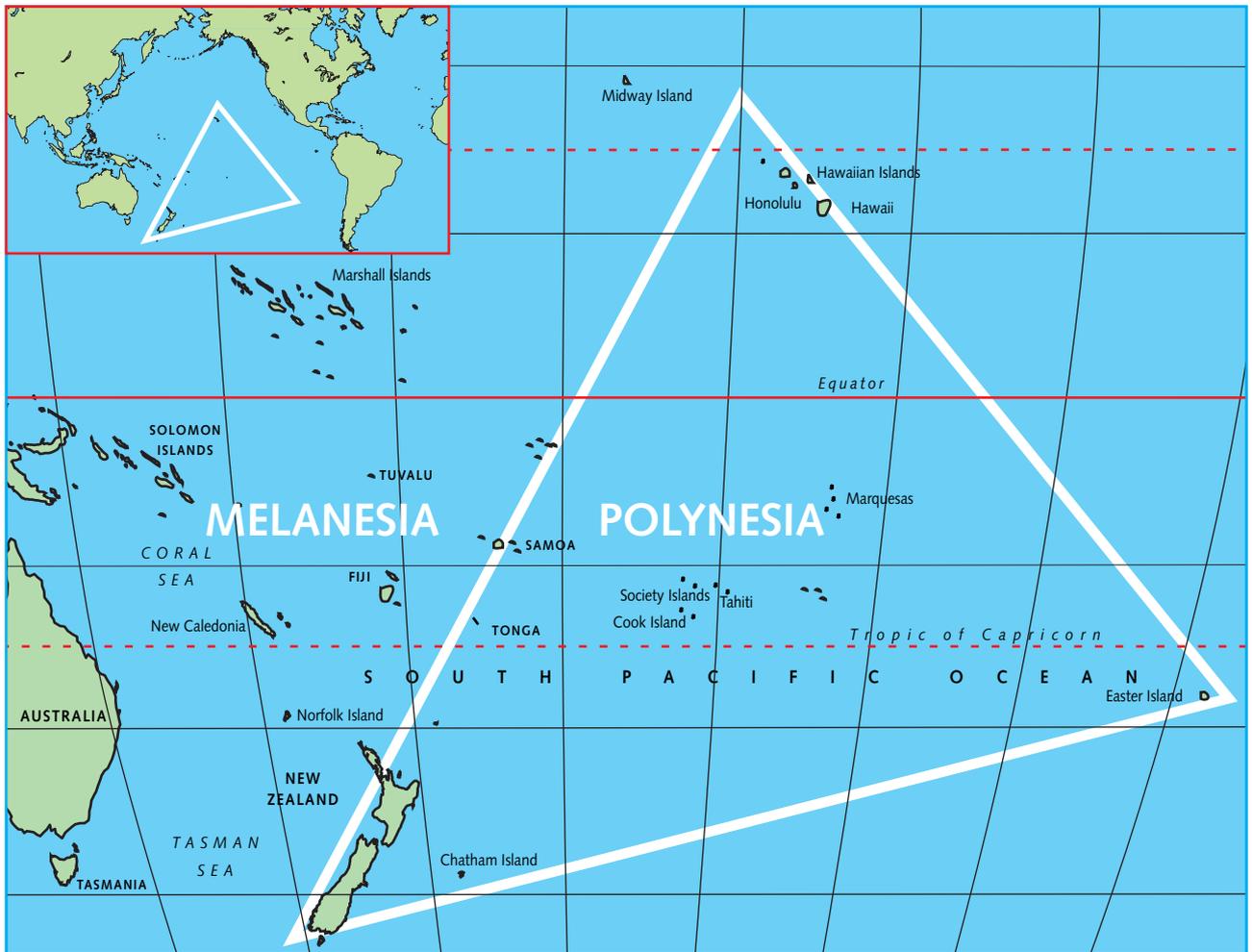


Who populated the Pacific?



- Where did the ancient Polynesians come from?
- Who were the first people to reach the Central Pacific?
- Was Easter Island settled from the east or from the west?
- Were there any trans-Pacific contacts between South America and Polynesia?
- When and how did people enter the New World?

The enormous triangle of Polynesia, bounded by Hawaii, Easter Island and New Zealand, was settled by humans for the first time during the last millennium. Present day inhabitants of remote Oceania show clear-cut affinities with Southeast Asia, but the routes and times of the migrations are still under debate.

The analysis of genetic information from modern day people can help us infer some of the answers to our questions, but only by looking at ancient DNA can we get direct genetic information about past events.

We have studied DNA from ancient human remains to try to address important questions on the migrations of past peoples out of Asia and into the Pacific and the New World.

There are considerable technical difficulties involved in the analysis of ancient human DNA sequences, which has dampened the enthusiasm of scientists working in the field. Although there are still few studies on

human populations based on ancient DNA, this technology has a unique role to play in our understanding of human evolution.

Using bone DNA, we can now identify the original settlers of Easter Island. Most of the original inhabitants succumbed after European contacts in the eighteen and nineteenth centuries and the modern people bear relatively little relation to their ancestors. However, our analysis of ancient bones showed that the original settlers were Polynesians from the West, rather than people from prehistoric South America.

Our results confirmed the view held

by most archaeologists, that is, the Polynesians spread throughout the eastern Pacific in the last couple of thousand years, eventually reaching New Zealand, Hawaii and Easter Island. However, our data indicate that the first people to reach the Central Pacific (Fiji, Tonga, Samoa) were probably Melanesians, rather than the ancestors of the modern Polynesians.

Skeletal remains are relatively scarce in parts of the Pacific and the New World, so to increase our genetic database we are also looking at DNA from modern people in these areas. Working with archaeologists and other geneticists, we hope to understand how and why people settled different parts of the Pacific region.

Molecular Signatures from the Past

The Ancient Biomolecules Initiative is a five-year programme to understand the fate of biological molecules in archaeological and fossil materials, and to explore the applications of this new knowledge. The Initiative is funded by the Natural Environment Research Council.

Who populated the Pacific: the science in detail



Photo courtesy of M. Ganczakowski

The study of human genetic variation is becoming increasingly important within the context of the Human Genome Project as a way to understand human evolutionary history and the variation in the susceptibility and prevalence to both infectious and inherited diseases in different population groups.

Ancient DNA research can add an important time dimension to the study of human populations, particularly those of remote or inaccessible places or where the original population has disappeared due to genetic mixing, migration, environmental changes or genocide.

The purpose of our project was to continue to develop the techniques for the extraction and analysis of DNA from bones and other old biological materials. Also, we were searching for new genetic markers for peoples of Asia, the Pacific and the New

World. Lastly, we proposed to compare genetic data with archaeological, anthropological and linguistic information, to throw light on the patterns of migrations of ancient peoples.

With the collaboration of colleagues in other institutions, including Clegg in Oxford, Schiefenhoewel in Andechs, Bowden in Melbourne, and others, we have analysed mitochondrial DNA (mtDNA) from ancient and modern people in mainland Asia, South-east Asia, Oceania and the New World. Our results confirm the generally held view that both Pacific and New World populations stem from ancient migrations out of Asia. However,

contrary to the belief of most archaeologists, Polynesians were probably not the first people to reach the Central Pacific. It looks as if Melanesian people expanded into the Pacific during the Pleistocene, followed more recently by the Polynesians, who went to settle the most remote parts of the Pacific, including New Zealand, Hawaii and Easter Island.

Using ancient DNA, we have been able to address for the first time the question of the genetic affinities of the original settlers of Easter Island. Analysis of ancient bones showed that the original settlers derived from the same mtDNA lineage as the Polynesians.

Our results of extensive analyses of coding and non-coding regions of the mtDNA genome of present-day Pacific islanders and Chileans suggests that the people from the Pacific coast of South America are closely related to the ancestors of the modern Polynesians and that both these groups have a recent common ancestor in South-east Asia.

Future Work

The Ancient DNA Laboratory at the Department of Biological Anthropology, Cambridge, closed on 30 September 1997. However, work continues on the analysis of genetic variation in ancient and modern populations of the Pacific and the New World. We are looking at the relationship between the settlement pattern in different islands and the prevalence of disease. We are also participating in a major study on social organisation in prehistoric Easter Island.

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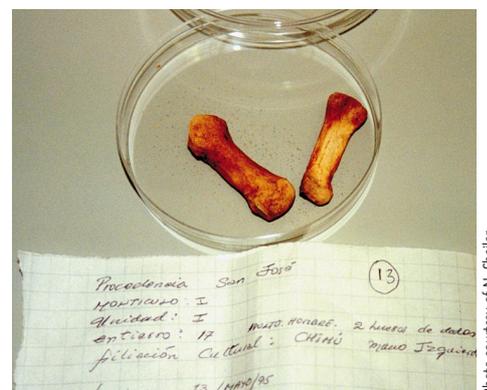


Photo courtesy of N. Shaller

Fingers of the left hand of an ancient inhabitant from Peru were subjected to DNA analysis in order to help infer the genetic origin of the prehistoric people of the coast of South America.

For more information, please contact:
Dr Erika Hagelberg,
Department of Genetics,
University of Cambridge,
Downing Street, Cambridge CB2 3EH,
tel: 01223 333999, fax: 01223 333992.
email: eh13@cus.cam.ac.uk