

Micronesian Islands colonized by small-bodied humans

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Since the reporting of the so-called “hobbit” fossil from the island of Flores in Indonesia, debate has raged as to whether these remains are of modern humans (*Homo sapiens*), reduced, for some reason, in stature, or whether they represent a new species, *Homo floresiensis*.

Reporting in this week’s *PLoS ONE* in a study funded by the National Geographic Society Mission Programs, Lee Berger and colleagues from the University of the Witwatersrand, Rutgers University and Duke University, describe the fossils of small-bodied humans from the Micronesian island of Palau. These people inhabited the island between 1400 and 3000 years ago and share some – although not all – features with the *H. floresiensis* specimens.

Palau is situated in the Western Caroline Islands and consists of a main island of Babeldaob, with hundreds of smaller rock islands to the south west, colloquially known as the “rock islands.” These rock islands contain caves and rock shelters, in many of which, fossilized and subfossilized human remains have been found. The specimens described by Berger and colleagues came from two such caves, Ucheliungs and Omedokel, which appear to have been used as burial sites.

In both caves, they found skeletons of individuals who would have been small even relative to other such populations and are approximately the size of *H. floresiensis* or small members of the genus *Australopithecus*. These fossils were radiocarbon dated to between 1410 and 2890 years ago. The entrance to Omedokel cave also contained the remains of larger

individuals dated to between 940 and 1080 years ago.

These two caves have provided and will continue to provide a wealth of specimens, which will need more intensive study. However, preliminary analysis of more than a dozen individuals including a male who would have weighed around 43 kg and a female of 29 kg, show that these small-bodied people had many craniofacial features considered unique to *H. sapiens*. These include: a distinct maxillary canine fossa, a clearly delimited mandibular mental trigone (in most specimens), moderate bossing of the frontal and parietal squama, a lateral prominence on the temporal mastoid process, reduced temporal juxtamastoid eminences and an en maison cranial vault profile with the greatest interparietal breadth high on the vault. Thus, these individuals are likely to be from a human population who acquired reduced stature, for some reason.

It is well established that populations living on isolated islands often consist of individuals of smaller stature than their mainland cousins – a phenomenon known as island dwarfism. This is true not just for humans but for many animals including extinct mammoths and elephants from islands off Siberia, California and even in the Mediterranean.

Alternatively, the island may have been colonized by a few small individuals, between 3,000 and 4,000 years ago who, through extensive inbreeding, and other environmental drivers, produced a small-bodied population, which continued to inhabit Palau until at least 1400 years ago.

As well as having characteristics of *H. sapiens*, the Palau fossils also have features seen in *H. floresiensis*, such as their small bodies and faces, pronounced supraorbital tori, non-projecting chins, relative megadontia, expansion of the occlusal surface of the premolars, rotation of teeth within the maxilla and mandible, and dental agenesis. Berger and colleagues do not infer from these features any direct relationship between the peoples of Palau and Flores; however, these observations do

suggest that at least some of the features which have been taken as evidence that the Flores individuals are members of a separate species, may be a common adaptation in humans of reduced stature.

Detailed analysis of the Palau specimens is unlikely to settle arguments over the status of *H. floresiensis* as there are features of Flores man, such as small brain size, not found in the people of Palau. Nevertheless, they do suggest that at least some of the unusual features seen in Flores are a result of environment rather than ancestral heritage. Above all, the skeletons from Palau should greatly increase our understanding of the process of island dwarfism in human populations and of the ancient colonizations of Oceania.

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