Hippo's island life helps explain dwarf hobbit (w/Video)

May 7 2009

This dwarf hippo skull from the Museum's collections is nearly 3000 years old and helped scientists explain the small brain of the hobbit. Image: Natural History Museum

Ancient Madagascan hippos have shed light on the origins of the small brain of the 1-metre-tall human, known as the hobbit, scientists at the Natural History Museum report in the journal *Nature* today.

By examining the skulls of extinct Madagascan hippos, Museum scientists discovered that dwarfed mammals on islands evolved much smaller brains in relation to their body size.

So Homo floresiensis may have had a tiny brain because it lived on an island. This is something which has been at the heart of the debate of the hobbit's origins, whose remains were uncovered on the Indonesian island of Flores in 2003.

The team suggests that the hobbit became a dwarf after its Homo erectus ancestor became isolated on the large island of Madagascar many years ago.

'The discovery of a small fossil human from the island of Flores with normal facial proportions but a brain the size of chimpanzee has baffled scientists,' explained Natural History Museum palaeontologist, Dr Eleanor Weston, who led the research.

'It could be that its skull is that of a dwarfed mammal living on an island. Looking at pygmy hippos in Madagascar, which possess exceptionally small brains for their size, suggests that the 'hobbit' was a dwarf resulting from its H. erectus ancestors being isolated on the island in the past.'

Analysing hippos

Madagascar has many diverse habitats and in the past, has been the home to at least 3 species of hippo.

The team studied species of extinct Madagascan hippos and their mainland ancestor, the large common hippopotamus.

One of the specimens used, from the Museum's mammal collection, was a nearly 3000-year-old dwarf hippo skull belonging to the extinct Hippopotamus madagascariensis.

Brain calculations

Hippo brain-body scaling trends were calculated from the relationship of brain to skull size.

'We found that the brain sizes of extinct dwarf hippos were still up to

30% smaller than you would expect by scaling down their mainland African ancestor to the dwarf's body size' explains Dr Weston.

'If the hippo model is applied to a typical H. erectus ancestor the resulting brain capacity is comparable to that of H. floresiensis.'

The brain of Homo floresiensis is the smallest yet known for any hominid, at around 400 mL.

A first for brain size

Although the phenomenon of dwarfism on islands is well recognised in large mammals, an accompanying reduction in brain size, as Dr Weston and Museum palaeontologist Professor Adrian Lister found, has never been clearly demonstrated before.

Energy use of brain

It may be advantageous to the survival of animals that become isolated on islands with unique environments, not only to become dwarfs, but also to reduce the size of their brain.

'The brain is a costly organ that uses a lot of energy,' says Dr Weston. 'Whatever the explanation for the tiny brain of floresiensis relative to its body size, it's likely that the fact that it lived on an island played a significant part in its evolution,' concludes Dr Weston.

Source: American Museum of Natural History (news : web)

Citation: Hippo's island life helps explain dwarf hobbit (w/Video) (2009, May 7) retrieved 19

April 2024 from https://phys.org/news/2009-05-hippo-island-life-dwarf-hobbit.html

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