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THE AMAZING AFROTHERIA

By Galen Rathbun

The relationship between sengis and other mammals is one of the most intriguing scenarios in African biology. It all started at the turn of the eighteenth century, when the first sengis were discovered and described by western biologists. Initially thought to be closely related to shrews, sengis were called 'elephant shrews' because of their pronounced, trunk-like noses. In the following two centuries, biologists struggled to understand their relationship to other mammals, moving through assumptions of their being related to tree shrews (and thus perhaps being primates), ungulates or even rabbits and hares. Eventually, most biologists agreed that sengis were not in fact closely related to any other mammals, and so they were placed into their own group (order Macroscelidea). But it was still far from clear what their evolutionary origins were.

Molecular biology finally closed the debate. By comparing proteins and DNA from many different mammal species, biologists traced sengi origins to the very early days of mammal evolution. Their full story is remarkable, especially within the context of the history of Earth itself.

The world's continents have not always existed as we know them today. About 130 million years ago, there was in the southern hemisphere a supercontinent now called Gondwana. And at about that time, Gondwana began to break up due to plate tectonics. By about 105 million years ago, large pieces of what would become South America, Antarctica, Madagascar, India and Australia had drifted apart, leaving a significant fragment in the middle: this became Africa. As Gondwana broke up, a small and primitive early placental mammal probably became isolated on that fragment of 'Island Africa'.

After Africa became a continent, that early isolated mammal eventually evolved into several distinct lineages or branches. One branch evolved into a group called the Paenungulata, which includes three orders that we know today as elephants, hyraxes and sea cows. Perhaps due to their large size and increased mobility, the sea cows and elephants are the only groups that left Africa and colonised other continents. And one hyrax species managed to spill out of Africa onto the southern Arabian Peninsula.

Aardvark

The three other lineages arising from that primitive mammal on 'Island Africa' represent species that even until today have remained restricted to Africa, mostly south of the Sahara Desert: the Afrosoricida, composed of the golden moles and tenrecs (the latter occurring mostly in Madagascar); the Tubulidentata, with only one living species—the aardvark; and the Macroscelidea, the sengis, which occur throughout most of Africa except far western Africa and the Sahara Desert (with one species in northern Africa). Despite the fact that the species in these lineages couldn't be more different from each other, DNA samples indicate that

Tree hyrax

African elephant

they are in fact all more closely related to each other than to any other mammal on Earth.

One reason for their complete lack of resemblance to each other is that they have been independently evolving for at least 45 million years. This seemingly odd assemblage of mammals is now taxonomically recognised as Afrotheria (or African mammals) and includes only about 80 living species—a very small number compared to the hundreds in other mammal orders such as bats, rodents and even primates. Indeed, this disparity is pivotal to the conservation value of the Afrotheria because just a few species extinctions could obliterate an entire order.

The Udzungwa Mountains, like many areas of Africa, are rich in representatives of the Afrotheria, including the African elephant, a tree hyrax, the aardvark and three species of sengi. Sea cows, being obligate aquatic and marine mammals, will of course never be found in the mountains; so far, the only tenrecs on mainland Africa are found in some mountain forests to the east of Tanzania. It is possible that a golden mole might occur in the Udzungwa Mountains, but so far none has been found.

It's time to appreciate the Afrotheria for the true evolutionary marvels that they are. Let's not be fooled by their traditional names. Golden moles are no more related to true moles than elephant shrews are to the true shrew lineage. The tiny frenetic shrew, with beady eyes and short little legs, scurrying about in the leaf litter, could not be further removed from the elegant sengi—with large brown eyes, a colourful coat, antelope-like long legs and a wonderful nose.