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Important gaps in the fossil record of Paleogene hystricognathous rodents revealed by dental morphology-based phylogeny of taxa from Asia and Africa: paleobiogeographical implications

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Modern African cane-, dassie- and mole-rats, Afro-Asian porcupines, and South American chinchillas, guinea pigs, spiny-rats, etc., make up the natural group of the hystricognathous rodents (Hystricognathi Tullberg, 1899). The hystricognathy is described on their lower jaw, which shows the origin of the angular process distinctly lateral to the plane of the incisor alveolus (contra the same plane in all other rodents = sciurognathy). A suite of morpho-anatomical traits (notably dental) and genetic data also define hystricognathous rodents. Hystricognaths share a common ancestry with modern African gundis or Ctenodactylidae (sciurognaths), both forming the suborder Ctenohystrica. From a paleontological perspective, the origin of hystricognaths, as that of gundis, can be traced back to the Eocene of Asia, as they are both nested within the Asian "ctenodactyloid" radiation, also including other extinct sciurognaths such as the Eocene Chapattimyidae, Yuomyidae, Tamquammyidae, Gobiomyidae, and the extant Diatomyidae. Although phylogeny implies Asia as the ancestral homeland of Hystricognathi, curiously the oldest known fossil occurrences of hystricognaths are not from Asia, where they are so far known only from the latest Eocene, but from Africa and South America, where they appear suddenly in the fossil record of both landmasses by the late middle Eocene. This points out the incompleteness of the Asian fossil record for hystricognaths, but also that this group rapidly achieved a widespread distribution throughout the Old and New Worlds sometime during the middle Eocene. We have performed a cladistic assessment of the dental evidence documenting several early Asian "ctenodactyloids" and all Paleogene African and Asian hystricognaths known thus far (or recognized as such). Even if the dentary bone is not documented for several taxa, based on dental evidence we suggest that some late and middle Eocene Asian "ctenodactyloids" are stem hystricognaths and pre-hystricognaths, respectively, although they were not recognized as such originally (e.g. *Dianomys*, *Ottomania*, *Anadianomys*). This view partially plugs the gap in the Eocene Asian hystricognath record. However, this phylogenetic context implies many ghost lineages for some Asian and African taxa, thereby underscoring the still poor documentation of early hystricognaths. It also implies a complex early historical biogeography of the group, involving multiple dispersal events from Asia to Africa sometime during the middle Eocene.

* Speaker

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