

## Molecular phylogenetics and the origins of placental mammals

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### Abstract

**The precise hierarchy of ancient divergence events that led to the present assemblage of modern placental mammals has been an area of controversy among morphologists, palaeontologists and molecular evolutionists. Here we address the potential weaknesses of limited character and taxon sampling in a comprehensive molecular phylogenetic analysis of 64 species sampled across all extant orders of placental mammals. We examined sequence variation in 18 homologous gene segments (including nearly 10,000 base pairs) that were selected for maximal phylogenetic informativeness in resolving the hierarchy of early mammalian divergence. Phylogenetic analyses identify four primary superordinal clades: (I) Afrotheria (elephants, manatees, hyraxes, tenrecs, armadillo and elephant shrews); (II) Xenarthra (sloths, anteaters and armadillos); (III) Glires (rodents and lagomorphs), as a sister taxon to primates, flying lemurs and tree shrews; and (IV) the remaining orders of placental mammals (cetaceans, artiodactyls, perissodactyls, carnivores, pangolins, bats and core insectivores). Our results provide new insight into the pattern of the early placental mammal radiation.**

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