Evolutionary history of macaques in East Asia: internal cranial morphology and its phylogenetic significance

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Macaca is one of the most successful genera of nonhuman primates. Macaques are usually classified into four species groups. The fascicularis and sinica groups are distributed widely from tropical to temperate zones in Asia; the former is more widely distributed in higher-latitude regions than the latter. The phylogenetic relationship of northern Chinese fossil species, M. anderssoni (Early Pleistocene, Mianchi), to living species is one of the key issues for interpreting paleobiogeographic events, but there is still controversial about whether M. anderssoni is phylogenetically related to the sinica group or the fascicularis group. The present study evaluated phylogenetic values of internal cranial variations in macaques to reappraise the phylogenetic position of M. anderssoni. Results indicated that nasal cavity shape well reflects phylogenetic relationships rather than environmental influences. Parsimonious reconstruction indicated that pear-shaped nasal cavity shown in members of the sinica group is derived condition among macaques. M. anderssoni shares pear-shaped nasal cavity with some living species of the sinica group, suggesting their phylogenetic closeness. The results of this work indicate that population of the sinica group was widely distributed in northern China during the Early to Middle Pleistocene, but they retreated southward into southern China and Indochina. On the other hand, the fascicularis group dispersed from Southeast Asia to East Asia since the Middle Pleistocene and acquired wide distribution in high latitude regions. Thus, in East Asia, the sinica group was replaced by the latecomer, the fascicularis group, probably due to the deterioration of climate during the Late Pleistocene.

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